x-rite

InkFormulation6

Windows®

OPERATING MANUAL

InkFormulation6

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Symbols / Indications

You only need to read this text if the relevant module is included in your software package.

Useful tips to a better understanding and an easier handling of the software.

If there are further information to the specified topic on another page in this manual, this symbol will show you the respective chapter.

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1 General

1.1 Introduction

InkFormulation software provides a fast, accurate and consistent ink formulation, formula creation, storage, approval and retrieval solution for offset, flexographic, gravure and screen-printing inks.

Thanks to a sophisticated math engine that provides better prediction of ink interactivity with substrates, InkFormulation 6 is able to rapidly calculate the optimal and most cost-effective recipe based on the printing process, ink, illumination, pigment pricing, and number of components and materials to be used. InkFormulation 6 helps printers and ink suppliers speed up the ink formulation workflow process (including special inks), with consistent, reproducible results on a broad variety of substrates and ink film thicknesses, including transparent films and metalized substrates. It also increases color accuracy, helping to meet color specifications better than ever before.

An easy user interface guides you through the process of formulating inks. Colorants can be grouped logically by application or by specific need. Allows for rapid selection while clear and flexible graphical displays help you evaluate and adjust proposed formulas.

1.2 Registration

Please return your completed registration card to X-Rite immediately or register at www.xrite.com/registration.

It is essential to register in order to access technical support and to receive important up-to-date product information.

You will find the hardware key ID either printed on the hardware key or in the software under menu item **Help** > **Info**.

1.3 Contact address of X-Rite

If you have questions or comments, please contact us at:

X-Rite, Incorporated
4300 44th Street, S.E.
Grand Rapids, MI 49512
U.S.A.

Telephone: 1 616 803 2100
Fax: 1 616 803 2705
Internet: www.xrite.com

If you experience problems with this program, please contact your X-Rite representative or us directly at the above address.
Please inform us immediately if you discover any errors in our program. We will, of course, eliminate them as soon as we can.

Suggestions for improvement
We welcome all comments and suggestions for improvement with regard to our programs. Please detail all items as thoroughly as possible so that we can support you in the best possible way.

1.4 Safety directives

In order to avoid improper operation, only trained personnel should use InkFormulation.

Please observe all notes provided in Chapter 27 “Installing InkFormulation”.

You should also observe the safety regulations in the operating manual for the spectrophotometer and the possibly connected further devices.

1.5 Notes on using this handbook

These operating instructions provide an introduction to X-Rite InkFormulation™ and explain the various functions and operational sequences.

Chapter 3	Terminology Basic sequence of a formulation
Chapters 4 - 22	Detailed sequence of a formulation, operation
Chapter 23	Important settings, parameters
Chapter 25	Application notes
Chapter 27	Installation

2. ColorNet

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2 ColorNet

2.1 General

X-Rite ColorNet™ completes the circle of complete color data processing in the graphics industry. In the sense of Total Quality Management and the ISO-quality standards, colorant data can be checked and controlled all the way from order receipt and color specimen measurement, on up to the adjustment of the printing press and job delivery. The programs grouped under ColorNet software – usable on WINDOWS – allow direct access to a central colorant database.

This allows the exact same data to be checked and statistically evaluated with ColorQuality, and to calculate color recipes for transparent and opaque inks using InkFormulation.

With one single, reliable, exact measurement, you can now cover various steps in the job sequence. ColorNet supports networks: Once-detected, original colors are stored on a server, where they can be called up at anytime by different users.

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3 Structure and function

3.1 General

The inks available for formulating recipes are measured with colorant calibrations and brought together in an assortment. Using the spectrophotometer or ColorNet, you can define your target color and it is then simple to calculate the optimum recipe. In formulating the target color through physical models, the color values of the mixture are determined on the basis of the optical data from the colorant calibrations. The data are then displayed on the screen.

Various program versions and auxiliary modules are available as options to extend the potential uses of InkFormulation.

See Section 3.7 “Program versions and auxiliary modules”.

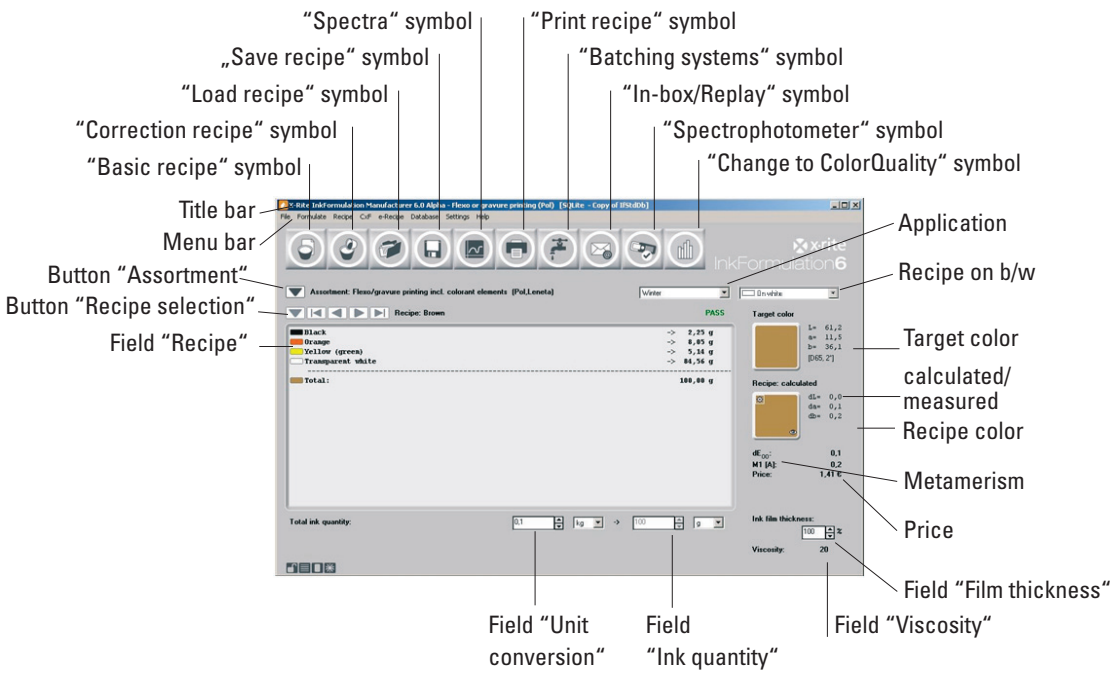
The user desktop of the InkFormulation is clearly laid out. You are taken through the sequence step by step. The data you require are displayed on screen simply by clicking with the mouse. You need to familiarize yourself with the basic structure of the program so that you can use InkFormulation quickly and easily. So, please study this chapter carefully.

3.2 Desktop

The desktop of the InkFormulation is based on a graphic user interface.

3.2.1 Main window

The main window clearly lays out all the operating elements you need to formulate a target color.



"Recipe selection" button

to previous recipe (ascending order)

to next recipe (descending order)

to first recipe

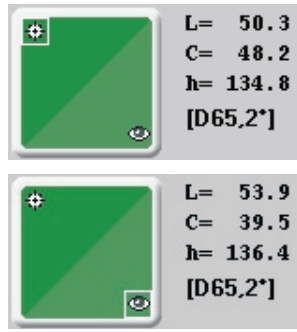
to last recipe

to recipe list (same as menu command **Recipe > Further recipes**).

Display "Opacity settings" or "white/black switch box"
(opacity module only)
This field depends on the formulation setting for the covering power. The opacity required is displayed in the cases **transparent**, **opaque** or **user-defined**. In the case of Target **color on white and black substrate** selection can be made between target color and recipe on white or target color and recipe on black.

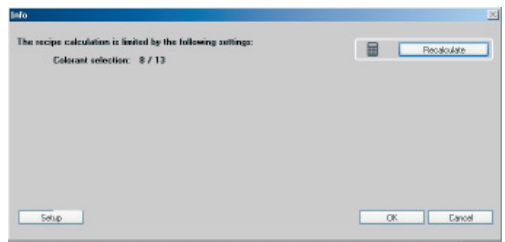
See Chapter 9 "Control of covering power".

Display "calculated/measured"
Here the target color and the recipe are shown in color. On the right beside the color fields can be seen the relevant Lab or LCh values.
If the substrates of the target color and the recipe differ in their surface properties, e.g. the target color is uncoated (rough) and the recipe coated (smooth), then, with certain instrument/filter combinations, InkFormulation automatically adjusts the measurements taken by the instrument ("Instrument" symbol) to suit the visual perception by the eye ("Visual" symbol).



The symbol for the display mode which is selected is boxed in. By clicking on the symbols in the color fields, the display mode can be changed at any time. However, it is recommended that you formulate colors in "Visual" mode, because in this mode InkFormulation automatically optimizes the recipes as required for visual perception. For further explanations, see Section 5.2.3 "Defining a target color".

Warning box
The warning box always appears following a recipe calculation if any setting has limited the achievable color space so much that the calculated color has too great a color difference from the target color. Clicking the warning box produces an **Info** window, which lists the settings which have possibly resulted in this high color difference:



The large difference in hue can possibly be removed by less strict demands. For this purpose the **Setup** button can be clicked. This produces the **Formulation settings** window, where the required changes can be made. After returning to the **Info** window, a new recipe calculation with the modified settings can be started by clicking **Recalculate**.

Display "Opacity" (opacity module only)
The opacity display indicates the covering power of an ink.
See Chapter 9 "Control of covering power".

- low dE[w/b]: high covering power
- high dE[w/b]: low covering power (transparent)

Display "Price"
"P1", "P2" or "P" is shown depending on setting (see Section 22.2.3 "Recipe output").

- P1 = print ready inks price
- P2 = basic materials price (basic materials module only)
- P = mixed price (basic materials module only)

Prices are entered per mass unit (e.g. per kg) and output per mass unit in the main window, independent of the ink quantity set. In the InkFormulation 6 without basic materials module, only one price type still appears, the so-called print ready inks price (P1). Input of prices for the individual inks of the assortment takes place as before in the **Set up colorant** window (see Section 14.4.3 "Defining an assortment").

Viscosity module: It should be noted here that the price of the solvent can now be entered in the **Set up assortment** window (see Section 14.4.3 "Defining an assortment").

Basic materials module: With this module a choice can be made between display of print ready inks prices (P1) and basic materials prices (P2).

Menu using the right-hand mouse button
If you click on the "Recipe" field with the right-hand mouse button, a menu comes up where you can perform various commands and change settings. If you click on the right-hand mouse button in the main window next to the "Recipe" field, you can use the menu to perform various commands for InkFormulation.

3.2.2 Menu bar

The menu bar displays the titles of the individual menus. Click on an item to display a list of additional functions.

You can execute the following commands in the various menus:

- File
  - Backup and restore database
  - Change user
  - Save configuration
  - Quit InkFormulation

The command **Save configuration** can be used to save the program settings in an *.ifc-file. By double clicking on this file in Explorer, InkFormulation can be opened at any time in the saved configuration.

- Formulate
  - Calculate basic recipe
  - Calculate correction recipe
  - Recalculate recipe
- Recipe
  - Enter recipe manually (new)
  - Print, load, save recipe
  - Copy recipe onto clipboard
  - Send recipe to batching systems
  - Send recipe to ColorQuality
  - Load recipe from ColorQuality
  - Convert recipe into a leftover
  - Reduce leftovers
  - Measure current ink mixture
  - Modify recipe
  - Add additional ink quantity
  - Calculate ink quantity
  - Display spectrum
  - Display other recipes

The commands **Correction recipe** and **Recalculate** in the **Formulate** menu and all commands in the **Recipe** menu, relate to the current recipe displayed in the main window.

- CxF
  - Browser
- e-Recipe*
  - Search the inbox for recipes
  - Create and send a recipe query
  - Reply to a recipe query
  - e-Reipe info
- Database
  - Organize the database
  - Process data from recipes, assortments, applications, substrates, substrate formats, basic materials and film thickness objects.
- Settings
  - Program and spectrophotometer settings, setup printer, batching and weighing system settings
- Help
  - Call up Help for InkFormulation
  - Register
  - Display program version and serial number

3.3 Basic sequence of an ink formulation

3.3.1 Selecting the assortment

First select the desired assortment (see Section 5.2.1 “Selecting an assortment”). This loads the colorants available for recipe calculation.

3.3.2 Checking settings and determining pre-settings

Check carefully to ensure that the general settings (e.g. default measurement conditions) and the recipe formulation settings have been correctly selected before you define the target color. Incorrect settings can lead to high color distances of the recipes (see Section 3.5 “Settings”, Section 23.1 “General settings”, Section 23.2 “Formulation settings” and also Section 23.10” Workflow settings”).

You can designate the ink quantity you require for your print job in the main window and, if you wish, you can also specify the use to be made of ink leftovers (see Chapter 10 “Using ink leftovers”).

* The module is no longer avaialable in InkFormulation 6.

3.3.3 Defining and formulating a target color

You define the target color by measuring the pattern with the spectrophotometer or by loading a reference color from ColorNet , CxF, color guide and Lab or LCh values (see Section 5.2.3 “Defining a target color”). After the target color has been defined, you will be asked to define the substrate (e.g. paper, etc) on which will be printed. InkFormulation then automatically carries out the formulation. Choose from a list of the best recipes the one you want and display the data in the main window.

3.3.4 Recalculating a recipe

You can change the settings selected for the formulation (assortment and recipe formulation settings) and recalculate the recipe quickly and easily without having to define the target color again (see Section 5.10 “Recalculating a recipe”). This allows you to check the effect of modified program settings, so that the recipe can be adapted quickly and optimally to your requirements.

3.3.5 Correction recipe

If a basic recipe mix does not satisfy your requirements, you can calculate the quantity of ink that needs to be added by measuring the existing mix. This will allow you to achieve a better match with the pattern (see Chapter 6 “Calculating a correction recipe”). When you save the recipe, the additional ink quantity will be added and so you will obtain an improved basic recipe.

3.3.6 Saving a recipe

If you want to save the recipe, InkFormulation will suggest a designation derived from the target color hue. This can be supplemented or overwritten and additional information can be entered in another information field. The recipe is then stored in the database. You can call it up and process it at any time (see Section 5.11 “Saving a recipe”).

You can also copy the recipe onto the clipboard for processing in other applications (see Section 5.7 “Copying a recipe onto the clipboard”).

3.4 Managing data

InkFormulation can be connected to more than one active database. New recipes are always saved in the same database as the selected assortment. A database can be opened at the same time by more than one InkFormulation, running on the same or different computers. Simultaneous access to the same database object is prevented by InkFormulation.
The database serves to store all data on your recipes, assortments, applications, substrates and substrate formats. You can process this data in many different ways:

In the menu **Database** > **Organize** you can:

- Set up new databases

- Connect and disconnect databases

In the **Recipe database** you can:
- Display designations and additional information
- Process existing recipes
- Print recipes
- Import and export recipes
- Batch processing
- Delete recipes.
- Search for recipes
- Send recipes

In the **Assortment database** you can:
- Display designations and additional information
- Define new assortments
- Process existing assortments
- Import and export assortments
- Delete assortments
- Search for assortments
- Send assortments

In the **Leftovers database** you can:
- Define new leftovers
- Process existing leftovers
- Delete leftovers
- Send substrates

In the **Applications** database you can:
- Create, modify and delete additives

In the **Substrate database** you can:
- Display designations and additional information
- Define new substrates
- Process existing substrates
- Import and export substrates
- Delete substrates
- Send substrates

In the **Substrate sizes database** you can:
- Display designations and additional information
- Define new substrate formats
- Process existing substrate formats
- Import and export substrate formats
- Delete substrate formats

In the **Basic materials database** (basic materials module only) you can:
- Display designations and additional information
- Define new basic materials
- Process existing basic materials
- Import and export basic materials
- Delete basic materials

In the **Film thickness object database** you can:
- Display designations and additional information
- Define new film thickness objects
- Process existing film thickness objects
- Import and export film thickness objects
- Delete film thickness objects

3.5 Settings

InkFormulation offers you a whole range of possibilities to meet your job requirements.

- With the menu command **Settings** > **General**, you can determine the settings for default measurement conditions (illuminant, observer, physical measuring conditions), the color system, the illuminants for metamerism, etc (see Section 23.1 “General settings”). Make sure that you have selected all settings correctly before you define a new target color, a new assortment or a new substrate. The physical measuring condition of the spectrophotometer is permanently allocated to a measurement and cannot be changed later.
- With the menu command **Settings** > **Formulation**, you can determine various specifications for the formulation of color selection before recipe calculation and ink film thickness, as well as the modes for recipe corrections, recipe output and check of covering power (see Section 23.2 “Formulation settings”).
- With the menu command **Settings** > **Display** you can define various parameters for the recipe output (see Section 23.5 “Settings display”).
- With the menu command **Settings** > **SPM**, you can display the data for your spectrophotometer and determine its interface (see Section 23.3 “Spectrophotometer settings”).

- With the menu command **Settings** > **Batching systems**, you can pre-select various weighing and batching systems (see Section 23.4 “Batching systems settings (module weighing and batching systems only)”).
- With the menu command **Settings > Communication** you can select the communications settings (see Section 23.6 “Communication settings”).
- With the menu command **Settings > Units** you can activate Unit conversion (see Section 23.8 “Unit settings”).
- With the menu commend **Settings > Library folder** you can modify the settings for the recipe folder (see section 13.9 “Recipe folder”).
- With the menu commend **Settings > Set up printer** you can configurate the print layout and change the set up for the printer (see section 22.2 “Layout”).
- With the menu commend **Settings > Workflow** you can activate and deactivate the single steps during the formulation workflow (see section 23.10 “Workflow settings”).

3.6 General operating information

While you work with InkFormulation, dialog boxes will be displayed during various sequences. These will point out certain processes or possibilities. Please read these notes thoroughly and carefully before you either acknowledge by clicking on **OK** or **Yes**, or interrupt the sequence with **No** or **Cancel**.

3.6.1 Symbols

The following symbols are used:

> Ink must be contained in recipe (see following note)
$ Ink leftover
~ Ink taken from another assortment
+ Palette recipe
! Non-proportional modified recipe

Symbol “ > “

It is now possible in the **Colorant selection** window (during recipe calculation) to determine components, which must be present in the recipe. For this purpose the required component must be selected and the **Modify** button clicked. A window appears, in which, in addition to restriction of the concentration, it can be stated whether the component is to appear in every recipe. If more than one component is specified, it means that at least one must be contained in the recipe.

If the use of ink leftovers is set, all ink leftovers are automatically preselected with **use in every recipe**.

3.6.2 Pushbuttons for standard functions

Pushbuttons are displayed for standard functions in different windows. No detailed explanation is given for them in the operating sequences:

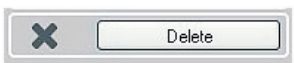
The entries made are saved and the window closed.

You quit the window. Entries or changes made are not saved.

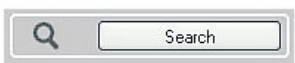
You can select all entries in a list in order to process them (e.g., print them) and then deselect them when you wish to select an individual entry. You can also select a number of items by holding down the CTRL key and clicking with the mouse on the required entries.

If you mark an item in a list (e.g. a recipe or assortment) and then click on **Modify**, another window opens in which you can change earlier entries. Double click on an item in a list to open the Modify window directly.

If you click on **Info**, another window appears with information and notices about the current object. Click **OK** to close the window.



You have to mark data before you can delete them. After you click on **Delete**, a dialog box appears. Here you must click on an **OK** button in order to confirm the deletion. Click on **Cancel** to cancel the deletion.



In the **Search criteria** window, you can enter a range of date, a label or an additional description. The list items (e.g. recipes or assortments) are displayed in accordance with the criteria entered. For the label and the additional description, you can use * as wildcard for one or more characters (e.g. BCD*HIJK*OP*RST).

3.6.3 Drag & Drop

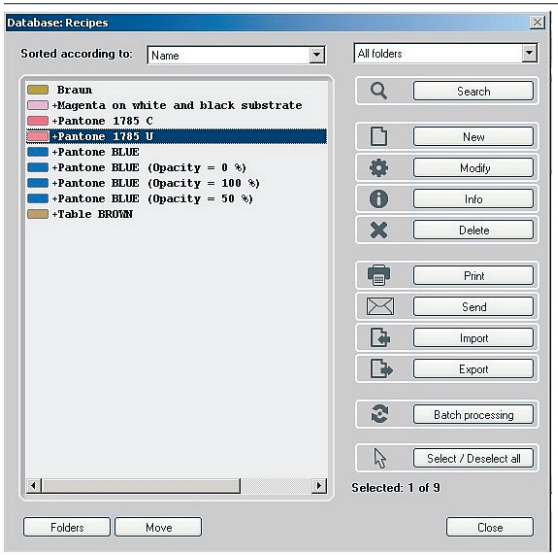
In the database dialog boxes, individual or multiple assortments, assortment colors, substrates, substrate formats etc. can be dragged directly into an Explore window. The data is saved as an ASCII file. This file can later be entered into InkFormulation using **Import**.

3.6.4 Email

For this function, a MAPI compatible email program such as Microsoft Exchange must have been installed. In the database windows, individual or multiple recipes, assortments, substrates, substrate formats etc. can be selected and then sent by email by clicking on **Send**.

1. In the database window select the data to be sent.
2. In the database window click on **Send**. Your standard email program will be started; an ASCII file is generated from the objects and attached to the email.
3. Before sending, complete the message by adding the address and any required text.

The recipient can save the attached file from his email program and then import it into InkFormulation.



3.7 Program versions and auxiliary modules

X-Rite InkFormulation™ is available in various versions. The range of application of InkFormulation can also be extended or operating sequences automated with auxiliary modules. These modules can be activated in a simple way (see Section 23.1.9 “Entering new functions”).

To obtain further information, please contact your X-Rite dealer or apply directly to X-Rite (see Section 1.3 “Contact address of X-Rite”).

3.7.1 InkFormulation 6 Manufacturer

Full version, for recipe formulation which can be provided with the following modules:

- Creation of assortments (colorant databases)
- Opaque inks (included as standard)
- Viscosity calculation (included as standard)
- Weighing and batching systems (included as standard)

- Basic materials calculation (included as standard)
- Thickness calibration

3.7.2 InkFormulation 6 PrinterPro

InkFormulation, full version, without the option of creating and changing assortments. The Printer Pro version is available with the following modules:

- Opaque inks (included as standard)
- Viscosity calculation (included as standard)
- Thickness calibration (optional)
- Weighing and batching systems (optional)
- Basic materials calculation (optional)

3.7.3 InkFormulation 6 PrinterBasic

This version of InkFormulation is specially designed to meet the needs of small and medium sized printing firms, which often print mixed colors incorrectly. While the quality of the formulation is the same as that in the other versions, the remaining functionality has been limited to the main needs of this sector (pressroom). This version therefore offers particularly good value for money.
For InkFormulation PrinterBasic, the following modules are available:

- Viscosity calculation
- Weighing and batching systems (optional)

3.7.4 InkFormulation 6 Online

InkFormulation Online enables users (e.g. ink manufacturers or large printing firms with more than one production site) to use InkFormulation via a web browser and to work using shared data which is held centrally. This version may be installed as part of a LAN or operated via the Internet.
InkFormulation Online is based on the InkFormulation Manufacturer version and therefore has the same basic functionality.
All modules are available for InkFormulation Online.

3.7.5 Definition of assortments module

Assortments cannot be processed or defined unless this module is activated.

3.7.6 Opaque inks module (scattering pigments)
Inks with scattering pigments can be read-in and calculated with the opacity module. In addition, functions for calculating covering power are provided (see Chapter 9 “Control of covering power (opacity module only)”).

3.7.7 Viscosity calculation module
The viscosity module enables the user to calculate recipes for any viscosities (see Section 14.4.7 “Entering a viscosity (viscosity module only)”). Its field of application is the flexo/gravure printing sector.

3.7.8 Weighing and batching systems module
This module permits the transfer of a recipe calculated by the InkFormulation to a weighing or batching system.

3.7.9 Basic materials calculation module
The basic materials module allows the user to split the inks into any number of partial components such as concentrates/pigments, additives and solvents (see Chapter 19 “Processing and creating basic materials (basic materials module only)”). It is used above all by ink manufacturers, as well as printing firms using concentrates, which have to be supplemented with additives and solvents.

3.7.10 E-recipe module
Note: The module e-recipe is no longer available in InkFormulation 6. If you purchased the module for a previous version, you can use it in InkFormulation but only with Microsoft Outlook 2000/2003.
This module conveys color specifications and recipes via the Internet between the printing firm, which defines and mixes the colors, and the ink manufacturer, who calculates and tests the recipe.

4. Starting InkFormulation

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4.2 Performing a white calibration of the spectrophotometer 33

4 Starting InkFormulation

4.1 Starting InkFormulation

The program must first be installed in accordance with the instructions given in Chapter 27 “Installing InkFormulation”.

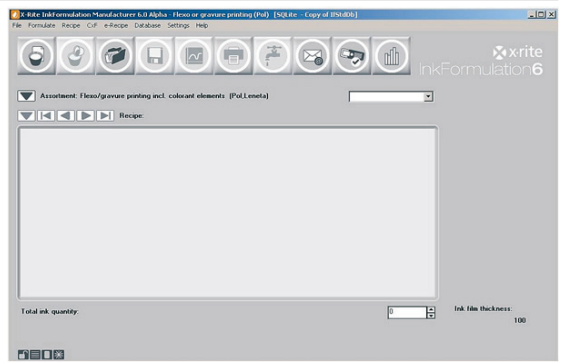
The spectrophotometer does not have to be connected when InkFormulation is started up. Even when you are working with the program, you can disconnect the spectrophotometer for off-line measurements and reconnect it to the computer later (see Section 23.3 “Spectrophotometer settings”).

1. Start InkFormulation.

If you start InkFormulation without the spectrophotometer connected, a **Searching for SPM** information window appears after the start screen. This indicates that the program is checking all interfaces. Click on **Cancel** to abort the search.

If InkFormulation is being started for the first time, the **Transformation of optical data** window may be displayed. If this is the case, the start-up may take somewhat longer.

After starting, you will see the following empty main window.



4.2 Performing a white calibration of the spectrophotometer

White calibration is the basis for exact measuring results. After you have selected the appropriate option (see Section 23.1 “General settings”), you will be requested to carry out a white calibration at various points during your work with InkFormulation.

If you have never calibrated your spectrophotometer before or if it has been a long time since the last calibration, then you should perform one without fail. If you do not want to perform a white calibration, you can skip the procedure by clicking on **No**.

For the exact procedure please refer to the operating instructions of your spectrophotometer.

5 Formulating a target color

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5 Formulating a target color

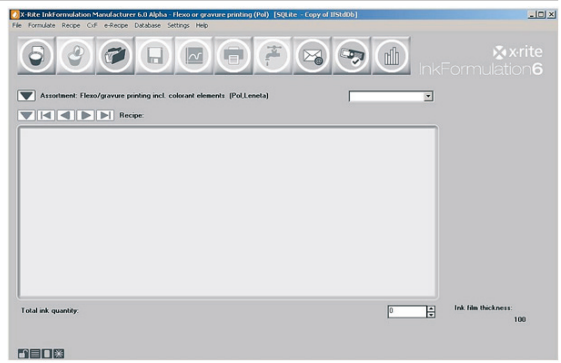
5.1 General

Recipe formulation means the calculation of the percentages of a mixture from the colorants available in the assortment selected.
The color to be reproduced is designated as the **target color**. It is measured as a pattern with the spectrophotometer or loaded as a reference color from ColorNet.

5.2 Formulating a target color

5.2.1 Selecting an assortment

If InkFormulation is being restarted, the main window will display as the current assortment that which was selected when you last quit the program.



Procedure to select a different assortment:

If you want to choose an assortment from a different database, you must first select it (see Section 21.3 “Selecting a database”).

1. In the main window, click on the **Assortment** button. The list of available assortments is displayed in the area on the left of the **Database: Assortments** window.
2. Click on the assortment required.
3. Click **OK**. The name of the assortment selected is displayed in the main window next to the **Assortment** button.

5.2.2 Checking settings and determining pre-settings

a. General settings:

Check that the default measuring conditions and the illuminants for metamerism are correctly set (see Section 23.1 “General settings”).

The recipes are optimized in relation to the settings for illuminant and observer.

b. Formulation settings

Check the formulation settings, (see Section 23.2 “Formulation settings”). Certain inputs (e.g. ink film thickness) can have a considerable effect on the recipe calculation.

c. Ink Quantity

In the **Ink Quantity** field, you can enter the desired quantity by overwriting the field or by clicking on the push button with the arrow symbol to increase or decrease the value indicated. You can also calculate the ink quantity after formulation to suit your print job (see Section 5.3 “Calculating the ink quantity”).

d. Use of ink leftovers

If you want to make use of leftovers, activate the **Use of ink leftovers** check box (see Chapter 10 “Using ink leftovers”).

5.2.3 Defining a target color

General

InkFormulation allows you not only to take proper account of the differing properties of the substrates for the target color and the recipe, but even to select an assortment for the formulation which differs in its surface properties from the recipe substrate which is to be printed. However, to do this the user must give the system the correct information about the substrate properties during the formulation process.

Below are some examples of possible combinations.

Example 1:

Target color on uncoated paper, recipe on coated paper using an assortment on coated paper.

Example 2:

Target color on uncoated paper, recipe on transparent film using an assortment on transparent film or on painted Leneta cards.

Example 3:

Target color on uncoated paper, recipe on reflective metalized film using an assortment on metalized film or on painted Leneta cards.

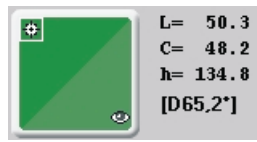
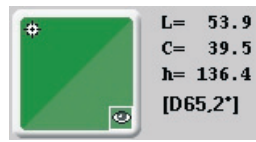
In principle, any combination of the following substrates is possible:

- Paper, coated or uncoated or opaque film
- Transparent film
- Metalized film (provided the measurement geometry is Diffus/8°(D8i)).

This considerable flexibility requires, however, that, for the filter settings Pol (for instruments with measurement geometry 45°/0°) and D8i (for instruments with measurement geometry Diffus/8°), with certain combinations of substrates InkFormulation has to make some compensation in the filter settings, in order to achieve a good visual match between the target color and the recipe.

This is necessary because in some cases color measurements taken using Pol and D8i do not coincide with those perceived by the human eye, where the surface properties of the substrates for the target color and the recipe are different (rough, smooth, reflective).

Example:

Filter	Target color	Recipe	Effect	
Pol	on **uncoated** paper (rough surface)	on **coated** paper (smooth surface)	An instrument fitted with a Pol filter perceives the target color on **uncoated** as darker than does the human eye.	With no compensation, the recipe on **coated** paper would turn out too dark. Compensation is made to adjust the brightness to suit visual perception.
				

Explanation:

The polarization filter has the property of not including in the measurement the light scattering effect exerted by an uncoated (rough) paper surface, because the filter only allows directed light through. The human eye, however, sees this scattering effect. This is the reason for the different perception by the instrument and by the eye.

If the surface structures of the substrates of the target color and the recipe are not different (e.g. both uncoated or both coated), then the above situation is not relevant and so does not have to be taken into account.

Below is a summary of possible combinations. It shows in which cases InkFormulation adapts the instrument measurement to suit the visual perception by the eye during formulation.

Filter setting	Measurement geometry	Target color or recipe	Adaptation
No	45°/0°	coated	no
No	45°/0°	uncoated	no
No	45°/0°	transparent film	no
Pol	45°/0°	coated	no
Pol	45°/0°	uncoated	yes (brighter)
Pol	45°/0°	transparent film	no
D65	45°/0°	coated	no
D65	45°/0°	uncoated	no
D65	45°/0°	transparent film	no
UV Cut	45°/0°	coated	no
UV Cut	45°/0°	uncoated	no
UV Cut	45°/0°	transparent film	no
D8i	Diffus/8°	coated	yes (darker)
D8i	Diffus/8°	uncoated	no
D8i	Diffus/8°	transparent film	yes (darker)
D8i	Diffus/8°	metalized film	yes (darker)
D8e	Diffus/8°	coated	no
D8e	Diffus/8°	uncoated	no
D8e	Diffus/8°	transparent film	no

You can measure the target color with the spectrophotometer or load it via ColorNet, Color Library or CxF.

a. Measuring the target color with the spectrophotometer

1. In the main window, click on the **Basic recipe** symbol or, in the **Formulate** menu, on **Basic recipe**. The **Basic recipe** window appears.
2. Prepare the spectrophotometer for the measurement of the pattern.

Where required by the type of pattern, you can carry out multiple measurements (see Section 23.1.5 “Averaging” and 25.2 “Measuring patterns”).

(Opacity module only): When setting **Target color on white and black substrate** a request is also made for a measurement with black substrate.

3. Click on **Measure**. Carry out a white calibration of your spectrophotometer if necessary or if asked to do so.

4. In the Substrate type window select the substrate type of the target color (coated or uncoated), when asked to do so.

b. Loading the target color from ColorNet

With ColorNet, you can use measurement values of stored recipes and also measurement values from any ColorNet application (ColorQuality, X-Rite SpectroServer) as the target color for a new recipe.

1. In the main window, click on the **Basic recipe** symbol or, in the **Formulate** menu, on **Basic recipe**. The **Basic recipe** window appears.
2. Click on **ColorNet**. The **ColorNet** window is displayed.
3. Double click on the desired directory in the left area of the **ColorNet** window.

If there are sub-directories, open these by double clicking. A list of the stored colors is displayed in the middle of the window.

4. Click on the color you want to use as the target color.
5. Click on **Select**.
6. In the **Substrate type** window select the substrate type of the target color (coated or uncoated), when asked to do so.

c. Loading the target color from Color Library

The InkFormulation contains the color guides of Pantone and HKS for the filter D65, No, Pol and UVcut.

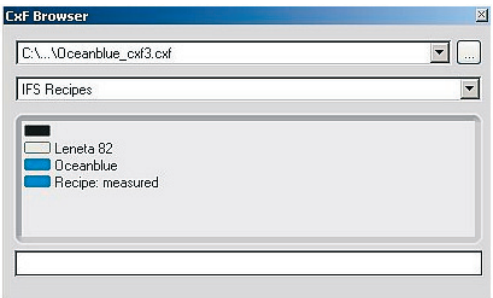
1. In the **Basic recipe** window, click on **Color libraries**.
2. On the top you can choose the desired color guide with the right filter.

In the list all colors are given.

3. Click on the color you want to use as the target color.
4. Click on **OK** to select.

You also have the option to search for the right color via the second row, the searching field.

5. Enter the name of the color. All colors containing the given designation are listed.



d. Loading the target color from CxF

With CxF you can select a target of all X-Rite application.

1. In the **Basic recipe** window, click on CxF.
2. First you have to give the path of the CxF file. The color information (target, recipe, substrate) are listed.
3. Select the information you want to use and continue.

e. Accepting current pattern

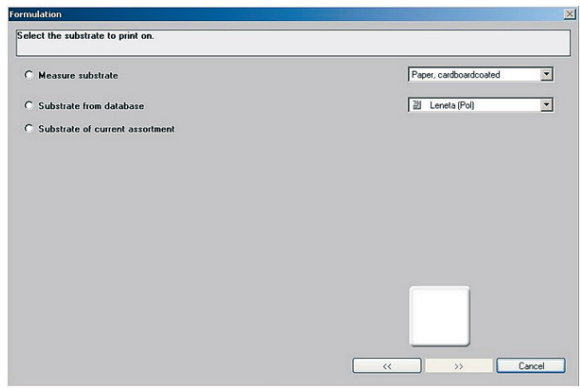
If a target color is already loaded in the main window, the **Skip** button also appears in the **Basic recipe** window. If this is clicked, the current target color is used for the recipe calculation (same as for **Formulate** > **Recalculate** menu command). In the Substrate type window select the substrate type of the target color (coated or uncoated), when asked to do so.

5.2.4 Defining a substrate

After you have defined the target color, the **Define Substrate** window can be used to measure the substrate with the spectrophotometer, to select the substrate of the current assortment resp. recipe or to load a substrate from the database.

If you have already measured a substrate or have loaded a recipe, the relevant substrates are displayed as additional options.

a. Measuring a substrate with the spectrophotometer



1. Select **Measure substrate** and then from the selection field select the substrate type corresponding to the one being used for formulation.

   Which substrate types are available for selection depends on the measuring instrument which is connected up. The substrate type **Metalized** is only available if a sphere based measurement geometry is connected, since that substrate type requires such an instrument.

   If the ink is to be formulated on **Transparent Film**, then the background material for measuring is very important. It is obvious that, when measuring a transparent film, the color of the background material will also be included in the measurement. It is therefore essential to ensure that the same white background is always used. Ideally, a painted white Leneta card or a neutral white ceramic tile should be used. Paper, for example, is quite unsuitable, because it contains optical brighteners.

2. Click on **OK**. The **Measure substrate** window comes up.
   If you want to load a substrate from ColorNet, click on **ColorNet** and then proceed in the same way as in Section 5.2.3 b “Loading a target color from ColorNet”.
3. Prepare the spectrophotometer for measuring the substrate.
4. Click on **Measure.** The substrate will be measured, and then the **Color Selection** window is displayed (see Section 5.2.6 “Selecting colorants from the assortment”).

b. Selecting the substrate of current assortment/recipe

1. Select the **Substrate of current assortment** or the **Substrate of current recipe** option and click on **OK**. The **Color Selection** window is displayed (see Section 5.2.6 “Selecting colorants from the assortment”).

c. Selecting substrate from database

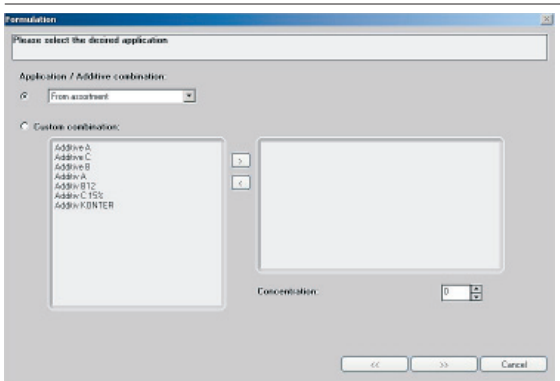
1. Select the **Substrate from database** option.
   The **Substrate Selection** list appears.
2. Select the desired substrate.
3. The selected substrate is loaded and then the **Color Selection** window is displayed (see Section 5.2.6 “Selecting colorants from the assortment”).

5.2.5 Applications

In the **Applications** window you can add additives to your recipe. This window is shown only if

- the user is working in basic material mode,
- in the current assortment basic materials are defined and
- combinations is defined at least.

In the **applications** window you can differentiate between already defined additives, new customized ones and the option to keep the defined additives from the assortment.



1. Select the option “Application/Additive combinations”. The already defined additives and option “From assortment” are shown. Select the application you want to use. The additives with the percentage are listed on the right side.
2. Select the option “Custom combination”. You can choose the additives you want to use for a new application. On the right side you define the percentage.
3. Select one combination and go to the next.

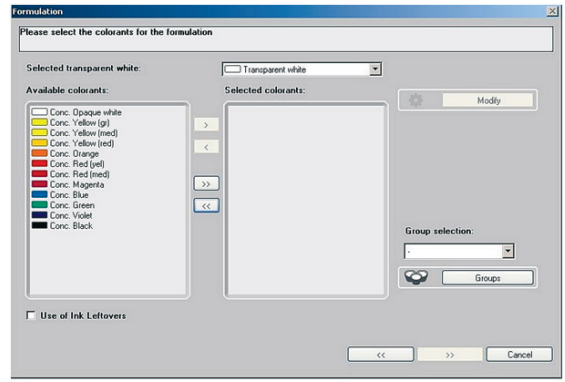
5.2.6 Selecting colorants from the assortment

The area on the left indicates the colorants available. The area in the center lists the colorants selected from the current assortment. This always includes transparent white.

If there is more than one transparent white included in the current assortment, these are shown in a separate list. The standard transparent white is pre-selected. By clicking on the arrow keys you can select a different transparent white.

The command button **Save group** can be used to put into a group colors which are always used together in formulations (see Section 14.4.9 “Forming color groups”).

1. In the **Available colorants** field, click on the colorant you want to use for the formulation.
2. Click on the pushbutton with the arrow showing to the right. The colorant appears in the **Selected colorants** field.



You can use the same procedure to return colorants from the **Selected colorants** field to the **Available colorants** field. A quicker way of selecting the desired colorant is to double click on it. The colorant is then immediately placed in the other field. If you click on the pushbutton with the double arrow, all the colorants are moved to the other field.

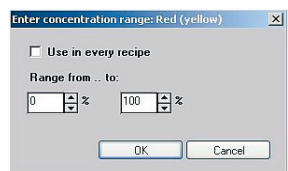
3. Repeat this procedure with all the colorants you want to use in the formulation.
4. If necessary, change the concentration range of the selected colorants (see Section 5.2.6 “Entering a concentration range”).
5. Click on **OK.** The basic recipe is calculated and the **Recipe Selection** window then appears (see Section 5.2.8 “Selecting a recipe”).

5.2.7 Entering a concentration range

In the **Colorant Selection** window, you can change the concentration range of the selected colorant. The default is the range defined in the assortment (see Section 14.4.3 “Defining an assortment”). The entries in this window apply only while you are working with the current assortment. If you load a new assortment, the concentration ranges defined in the assortment will again apply.

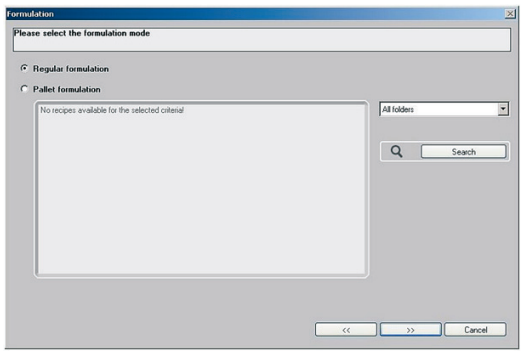
For the **Use in every recipe** check box, note the “ **>** ” symbol explanation in Section 3.6.1 “Symbols”.

1. Click on the colorant whose concentration range you want to change.
2. Click on **Modify**. The **Enter concentration range** window appears.



3. Change the values in the **Range from .. to** fields by overwriting or by clicking on the pushbuttons with the arrow symbols.
4. Click on **OK** once you have finished making entries.

If you enter a concentration range which diverges from the standard (0%...100%), this will be displayed together with the colorant designation.

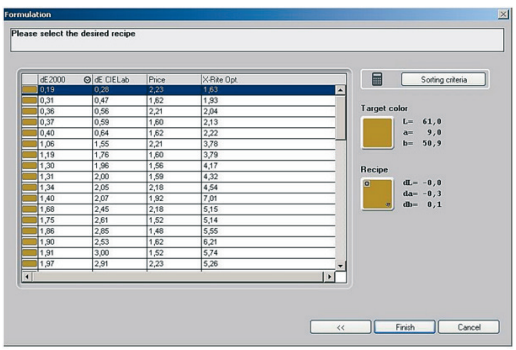


5.2.8 Formulation mode

The user can differentiate between regular and palette formulation.

Choosing palette formulation, the list with the available palette recipes is activated.

That window is optional. If you don't use palette formulation you can deactivate this window in the Settings: Workflow.

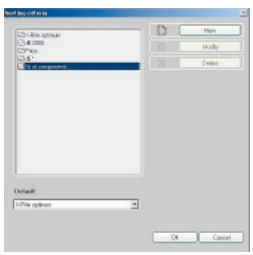


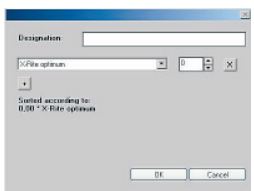
5.2.9 Selecting a recipe

The recipe list field displays the best recipes on the basis of the selected sorting criterion which has been activated .

1. Click on the desired sorting criterion. The recipes are automatically sorted to the new critera.

2. Click on the sorting criteria button on the right side.





In the Sorting criteria window the available criteria are listed. A single criterion can be deactivated by clicking the desired box.

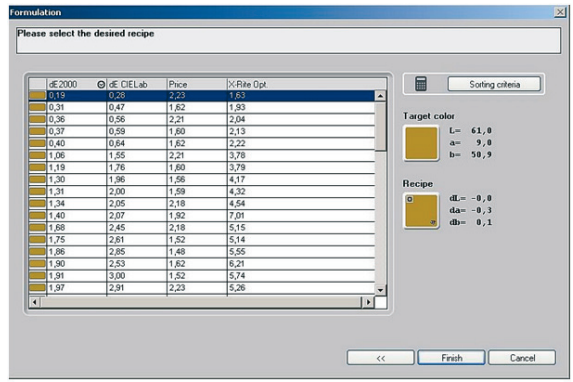
3. Click on **New** to create your own criterion.

4. Enter the designation.

In the table you can weight each desired criterion. The formula for your sorting is automatically shown.

Further information can be found in section 25.4, **Application Notes** "Sorting criteria editor".

5. Click **OK** if the recipe displayed in the **Recipe list** field meets your requirements. The full recipe is then displayed the main window.



The right-hand side of the main window displays the target color (pattern), together with the color values and the recipe color, plus the deviations from the target color. The color values and deviations are displayed in accordance with the selected color system (see Section 23.1 “General settings”).

The metamerism values M1 and M2 in the lower area of the window are displayed for the illuminants selected (see Section 23.1 “General settings”).

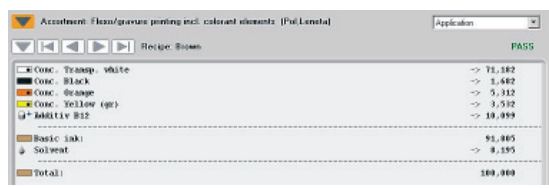
The Recipe list field displays the recipe with the used components and the percentage.
Accordingly to the selected recipe output you get different color patches:

Basic material mode

Basic inks and solvent mode

Print ready inks mode

Using the recipe output basic inks and solvent or basic material the amount of solvent is displayed excluded:



If you want to display a different recipe which has been calculated, click on in the **Recipe selection** button or on **Further recipes** in the **Recipe** menu. You can then select the desired recipe from the **Recipe selection** window.

By clicking on the pushbuttons with the arrow symbols in the **Recipe selection** button, you can display the next recipe up or down in the list of the calculated recipes immediately (see section 3.2.1 “Main window”).

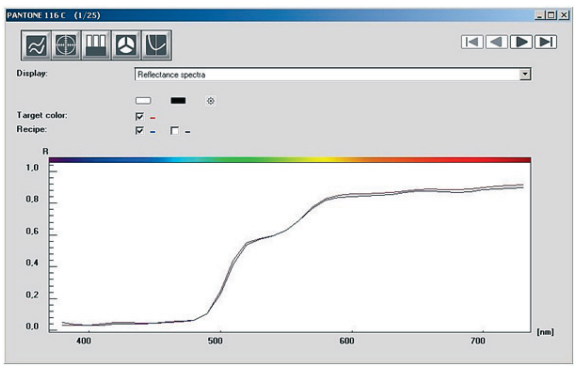
A further way of assessing a recipe is to compare the spectra of the target color and the recipe (see Section 5.2.10 “Displaying spectra”).

You can subsequently change the entries displayed in the **Film thickness** and **Viscosity** fields (see Section 5.4 “Changing the film thickness or viscosity of a recipe”).

If you change the entry in the **Ink quantity** field, the values for the individual colorant components are immediately updated. You can also calculate the ink quantity needed for your print job (see Section 5.3 "Calculating the ink quantity").

5.2.10 Displaying spectra

When you have calculated a recipe in the main window or loaded it from the database, you can display the recipe and the target color graphically in different ways.
The recipe spectra are displayed in a window adjustable in size (e.g. full screen). The window can be placed by the main window.



1. Click on **Spectra** in the **Recipe** menu or on the **Spectra** symbol.

It is always the currently active recipe which is displayed. Scrolling forwards or backwards in the recipe list is possible by clicking the arrow buttons.

2. Use the symbols top left to select the type of display:

Reflectance or density spectra of target color and recipe

Representation in the color space

Target color and recipe on white and black for the three illuminants which have been set. (See section 23.1 "General settings".)

Display the recipe under various types of illumination

Display behavior when the film thickness is changed (sensitivity to film thickness)

In the spectra display you can choose in the **Display** field between reflection and density spectra. By clicking in the check boxes you can select the display which is to be displayed (target color and recipe on white and black, where available).

5.3 Calculating the ink quantity

Once you have calculated a recipe in the main window or loaded it from the database, you can calculate the necessary ink quantity from the print order data.

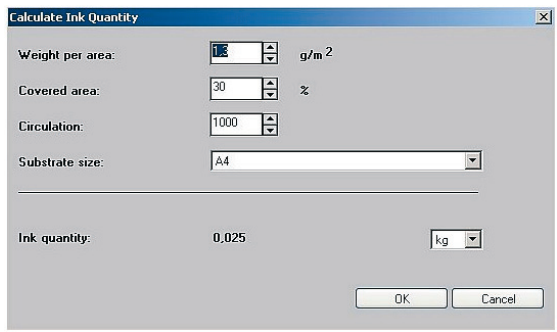
1. Click on **Calculate ink quantity** in the **Recipe** window. The **Calculate Ink Quantity** window appears.
2. Enter the desired values in the **Weight per area**, **Covered area** and **Circulation** fields.

The covered area designates the percentage of the substrate which is covered with ink.

3. Click in the **Substrate size** field and then select the desired substrate format from the list displayed.

The required ink quantity is displayed in the lower part of the window. The ink quantity is immediately updated upon any change in the entry.

4. Click on **OK** once you have made all your entries. The ink quantity calculated is displayed in the **Ink quantity** field of the main window.



5.4 Changing the film thickness or viscosity of a recipe

When a recipe is displayed in the main window, you can change the **Film thickness** or the **Viscosity** (viscosity module only)**.** InkFormulation recalculates the percentages of the ink components for the current recipe. In essence all that changes is the percentage of transparent white.

(viscosity module only): The **Viscosity** field is displayed only when entries for viscosity are being made (see Section 14.4.2 “Preparing an assortment”, Section 14.4.7 “Entering a viscosity” and Section 23.2 “Formulation settings”).

1. Enter the desired value in the **Film thickness** or **Viscosity** field.

(viscosity module only): When viscosity is reduced, the proportion of solvent rises at the expense of the transparent white and, vice-versa, when viscosity is increased, the proportion of solvent is reduced in favor of the transparent white.

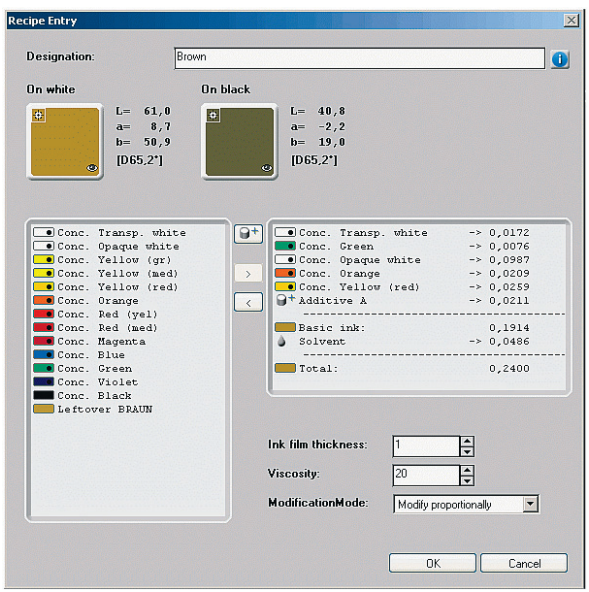
5.5 Modifying a recipe

Normally, you define the color values of a target color by measuring or by loading from ColorNet. Next, you calculate the recipe, which consists of the color components and their quantities.

You can use the command **Recipe** > **Modify** to carry out the recipe calculation the other way round, i.e. by entering the quantities of the color components. InkFormulation then works out the color values for you. Thus, starting out from the current recipe, you can observe the effects on the color values of the recipe and the deviations in relation to the current target color by changing the quantities of one or more components. This means that you have available not only the components of the current recipe but the whole range of the current assortment.

1. Load the recipe you want to modify.
2. Click on **Modify** in the **Recipe** menu.
   The **Recipe Entry** window appears.

   If you click on the colorant to be modified in the **Recipe** field in the main window, the **Recipe Entry** window is displayed. The colorant to be changed is selected and the relevant colorant quantity is displayed in the **Ink quantity** field.
3. If you wish, you can change the designation and the additional description.
4. Click in the right-hand field on the colorant/basic material whose quantity you want to change.
5. Change the value in the **Ink quantity** field.
6. If you wish to change the color quantities of other colorants/basic materials, return to Step 4 and repeat the process.
7. If you wish to change the application, click on the button . (See section 5.2.5 “Application”).



In the dialog **recipe entry** you can modify your recipes using three different modes:

Modify proportionally

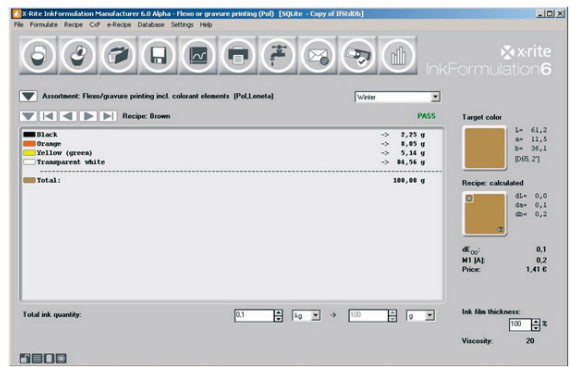
The recipe is changed proportionally. Changes are only made to the ink concentration. The percentages of additives, transparent white and/or solvent are recalculated automatically.

Keep additive percentage
Changes can also be made by varying the ink concentration. The percentages of the additives in the assortment that are assigned to that concentration are recalculated automatically. The ratio of additives to concentration remains constant.

Free modification
The user can change the recipe ratios without restrictions. The changes have no affect on other ink components. The solvent is handled separately and cannot be changed. You can reduce or increase the amount of solvent using the viscosity slider.
The "Free modification" mode is recommended for advanced users only. With this function, the user can modify the recommended ratio of ink components without restriction, which can severely affect the print quality. When using this mode, InkFormulation 6 displays a warning. X-Rite does not assume any responsibility if this warning is ignored.

8. If you wish, change the value in the **Ink film thickness** field and in the **viscosity** field (viscosity module only).
9. Click on **OK** once you have made all your changes.

The **Recipe** field displays the components and the quantities corresponding to your entries. On the right of the main window, you will see the target color (pattern) with the color values and the color of the recipe with the recalculated deviations in relation to the target color.



5.6 Entering a recipe

By using the command button **New** in the **Recipe** menu it is possible to enter a recipe manually. After the color and substrate have been defined, the components are selected from the current assortment and their quantities entered. If the color has been defined by a measurement, the recipe can be saved as a palette formulation. If the color measuring process is omitted, then the recipe color is calculated (inverse recipe calculation: color quantities > color values). This manual entry option is mainly used for archiving recipes not compiled using InkFormulation.

Entering new recipes is dependent on the setting for the recipe output (see Section 23.2 “Formulation settings”). Basic inks and solvents: The required amount of solvent is calculated based on the viscosity entry.

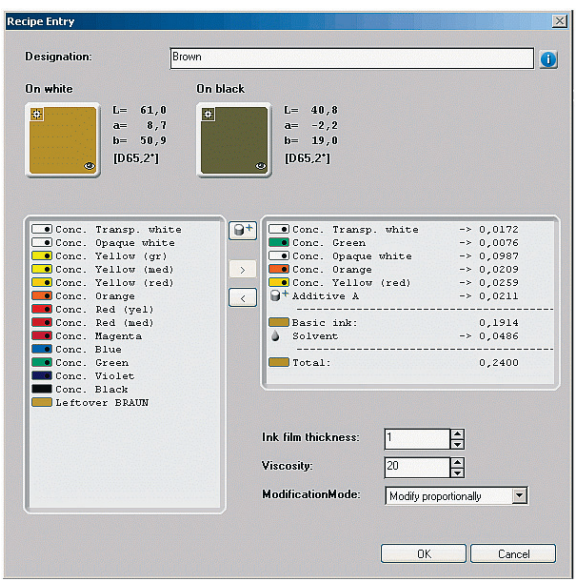
If the setting “Target color on white and black substrate” is being used (see Section 23.2 “Formulation settings”) then the recipe color can be defined on white and black substrate.

1. In the main window select the assortment which includes the colors in question.
2. On the **Recipe** menu click on **New** and define the current ink mixture.

   Proceed as in Section 5.2.3 “Defining a target color”. When you click on **Calculate,** the recipe color is calculated from the color and basic material quantities which have been entered.

   When the current ink mixture has been defined, the **Define substrate** window appears.
3. Define the substrate (see Section 5.2.4 “Defining a substrate”).
4. Define the application (see Section 5.2.5 “Applications”).

   When the combination has been defined, the **Enter recipe** window appears.
5. Make the required entries in the **Designation** and **additional description** fields.
6. Double click in the list on the color or basic materials for which you want to enter the amount. The ink component is transferred to the right-hand field and the entry field **Ink quantity** is activated.



7. In the **Ink quantity** field enter the values for the selected color or basic material.
8. To enter ink quantities for other colors or basic materials repeat the procedure from step 6.
9. If required, change the value entered in the **Film thickness** field and the **Viscosity** field (only the viscosity module).
10. If required, change the application clicking on the button:

    (see Section 5.2.5 Applications).

(only basic material mode): Depending on the settings for the recipe you can change the Modifiation Mode (see Section 5.5 Modifying a recipe).

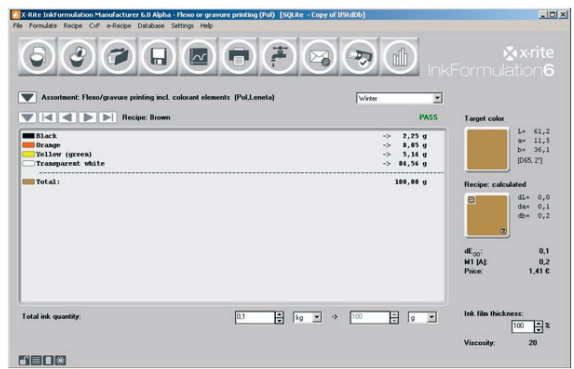
11. Click **OK** when you have made all the entries.

In the Recipe field the components and quantities are displayed as you have entered them. In the right-hand section of the main window you will see the target color with the color values.

5.7 Copying a recipe onto the clipboard

The clipboard allows you to use InkFormulation recipe data in another Windows application.

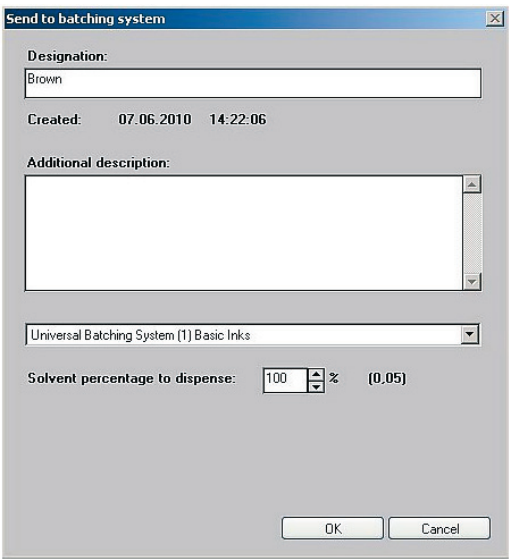
1. Click on **Copy to clipboard** in the **Recipe** menu.
2. Move from InkFormulation to the application in which you want to use the recipe. Normally, you can transfer the recipe by clicking on **Paste** in the **Edit** menu.



5.8 Initiating data transfer to the batching or weighing system

(Weighing and batching systems module only)

If a recipe is displayed in the main window, you can use this module to initiate the transfer of recipe data to a batching or weighing system.



1. In the main window, click on the **Batching systems** symbol or in the **Recipe** menu on **Send to batching system**. The **Batching systems selection** window appears.
2. If you wish, change the pre-selected recipe designation or enter an additional description.
3. Click in the **Batching systems selection** field and select the desired batching or weighing system from the list displayed.
   Notes: If you define "Basic Inks and solvent" or "Basic materials" in the recipe output for the batching system, you can reduce the solvent percentage for dispensing (see Section 23.4 "Batching Systems").

   The selection list only appears when more than one batching or weighing system is activated (see Section 23.4 "Batching systems settings").
4. Click on **OK**.

5.9 Measure current ink mixture

This menu option is used to transfer the reflectance values effectively achieved to a mixed recipe. When the recipe receives this information, the calculated reflectance is replaced by the measured one and all following program calculations (particularly the correction calculation) are based on the effective reflectance values. A recipe of this kind is proposed in the standard way as palette recipe. With this menu option it can be clarified quickly whether a correction is necessary, since following measurement of the mixture, the deviations of the color effectively achieved are shown in comparison with the target color. It is not necessary to measure the ink mixture for recipe correction.

1. Load the recipe associated with the ink mixture.
2. Click on **Measure current ink mixture** in **Recipe** menu.

   You can also click on the recipe color field to open the window to measure the current ink mixture.

3. Define the ink mixture.

   Proceed in the same way as when defining a target color (see Section 5.2.3 “Defining a target color”).

The ink mixture with deviations from the target color is then displayed in the right-hand zone of the main window.

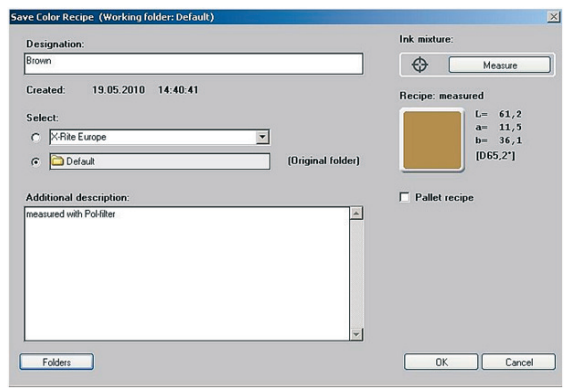
5.10 Recalculating a recipe

If you have already calculated a recipe or loaded one from the database, you can recalculate it with different settings to check the effects without having to redefine the target color.

1. If you wish, select a different assortment.
2. If you wish, change the entries with the menu command **Settings** > **Formulation** (e.g. ink film thickness).
3. Click on **Recalculate** in the **Formulate** menu

   You now proceed in the same way as for a basic recipe (see Section 5.2 “Formulating a target color”).

5.11 Saving a recipe



1. Click on the **Save recipe** symbol or on **Save** in the **Recipe** menu. The **Save Color Recipe** window appears. In the **Designation** field, InkFormulation suggests a designation derived from the hue of the target color.
2. Make the required entries in the **Designation** and the **Additional description** fields.
3. Click on **Measure** if the current ink mixture is to be measured (see Section 5.9 “Measure current ink mixture”).

   If the current ink mixture has been measured, the recipe can be saved as **Palette recipe** by activating the check box (see Chapter 7 “Formulating with palette formulation”).
4. Click on **OK**. The recipe is saved in the current folder. The recipe designation which has been entered will be displayed in the main window next to the **Recipe** designation.

   The current folder is displayed in the **Additional description** field. If you want to change the folder, click on **Change folder.** In the window which is displayed you can select the folder or create a new one.

6 Calculating a correction recipe

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6.2 Correction recipe 59

6 Calculating a correction recipe

6.1 General

If the mix of a basic recipe does not meet your requirements, you can calculate a correction recipe basing on the measurement of the current ink mixture and so achieve a better match with the target color.
Selection between the **Basic recipe mode** and **Addition mode** can be made with the menu command **Settings** > **Formulation** (see Section 23.2 “Formulation settings”).

- If the **Basic recipe mode** is selected, an improved basic recipe is displayed for recipe output in the main window.
- If the **Addition mode** is selected, the ink quantities for the basic recipe and additional ink are displayed separately in the main window.

6.2 Correction recipe

1. Click on the **Correction recipe** symbol or on **Correction recipe** in the **Formulate** menu.
2. Define the current ink mixture, provided this has not already been defined earlier (see Section 5.9 “Measure current ink mixture”).

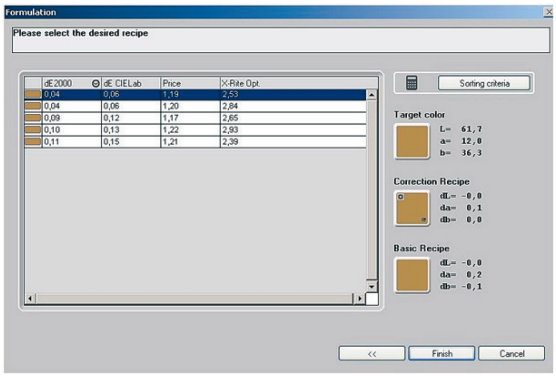
In every case, the colorants contained in the basic recipe will be used in the correction recipe.

3. Correct the list of colorants selected (see Section 5.2.6 “Selecting colorants from the assortment”) and then click on **OK**.

Proceed in the same way as for defining a target color (see Section 5.2.3 “Defining a target color”).

4. Select the desired application.

The correction recipe is then calculated.



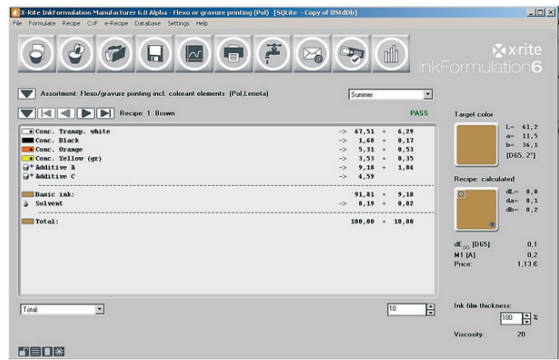
5. In the **Recipe Selection** window, select the recipe which most closely matches your requirements (see Section 5.2.9 “Selecting a recipe”) and click on **OK**.

   If the **Basic recipe mode** is selected, subsequently the main window is displayed (see step 5).

The lower area of the window displays the target color (pattern) and color values, the corrected color and the current ink mixture with the deviations in relation to the target color.

You can change the existing ink quantity.

6. Click on **OK** once you have made all the entries.
   The main window appears.



The **Recipe** field displays the components used in the recipe selected, together with the ink quantities for the basic recipe (left) and the additional ink quantities (right) for the correction recipe (addition mode only).

You can add the additional ink quantities by clicking on **Add additional ink quantity** in the **Recipe** menu. When you then save the recipe displayed, the additional ink quantity is automatically added. For this reason, you should print the recipe out first if you want to use the additional ink quantities for a correction.

7 Formulating with palette formulation

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7.2 Palette formulation 65

7 Formulating with palette formulation

7.1 General

The mode **Palette Formulation** in the formulation workflow offers the possibility to obtain better basic recipes if a recipe "matching" the target color can be found in the database (so-called palette recipe). Recipes are only suggested which are marked as palette recipe and for which the following differences are not too great:

- dE (standard illuminant) and dE (first metamerism illuminant) between target color and recipe color
- dE (standard illuminant) and physical difference (roughness) between current substrate and recipe substrate (dependent on covering power of recipe ink)
- Film thickness of recipe and film thickness in the settings
- Target viscosity and viscosity of recipe
- Difference in opacity settings. When using applications,

  only palette formulations with the same combination are displayed.

7.2 Palette formulation

The palette formulation is integrated into the formulation workflow. After defining target, substrate, ink film thickness, applications and colorant selection you have to differentiate between standard and palette formulation.

1. Select **palette formulation**. You get an overview of available formulation. Choose the formulation you want to use and continue.

8 Loading an existing recipe

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8.2 Define target color > Get 69

8 Loading an existing recipe

8.1 Loading a recipe

The **Load** menu command is used to load the entire recipe including the associated target color in the main window.

1. In the main window, click on the **Load recipe** symbol or on **Get** in the **Recipe** menu.
   A list of all the recipes stored is displayed in the left area of the **Database: Recipes** window.

The recipe list can be sorted according to various criteria (see Section 13.2 “Sorting recipe list”).

2. Click on the desired recipe.

Observe the info window (see Section 13.1 “Opening database recipes”).

3. Click on **Select**. The recipe is loaded and displayed in the main window.

8.2 Define target color > Get

This menu command is used to measure a target color and then to find and load the recipe with the least color distance. When loading the recipe in the main window, the target color currently measured is not overwritten with the pattern of the recipe.

The loading of a recipe with its target color is possible with the **Load** menu command (see Section 8.1 “Loading a recipe”).

1. Click on **Define target color** > **Get** in the **Recipe** menu.
2. Define the target color.

Proceed in the same way as in Section 5.2.3 “Defining a target color”.

A list of recipes of the current range is then shown in the left sector of the **Database: Recipes** window. The recipes are arranged according to the dE X-Rite color distance from the current target color. To sort according to other criteria note Section 13.2 “Sorting recipe list”.

dE X-Rite is a quality criterion for using ink leftovers. Among other things, it takes into account the fact that it is very difficult to achieve a pure ink with a dirty ink leftover.

3. Click on the desired recipe.

4. Click on **Select**. The recipe is loaded and displayed in the main window.

If you find no suitable recipe, you can calculate a recipe for the target color measured by clicking **Close** in the **Database: Recipes** window and then selecting the **Recalculate** menu command (see Section 5.10 “Recalculating a recipe”).

9 Control of covering power (opacity module only)

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9.2 Input of percentage for covering power 73
9.3 Measurement of target color on white and black 74

9 Control of covering power (opacity module only)

9.1 General

In addition to color optimization the InkFormulation 6 can also take account of the covering power (opacity) of the ink film. This is performed by entering a percentage from 0% (transparent) to 100% (opaque) in the settings for the formulation or, provided the target color to be set is present both on white and black substrate, by an additional measurement of the target color on black substrate. In both cases the dE of the ink film on white and black substrate (dE[w/b]) is shown as additional information in the main window. This is an inverse measure of opacity. An ink film with high covering power has a low dE[w/b] value and vice-versa.

It is obvious that the color optimization with simultaneous optimization of the opacity can be negatively influenced (when for example a high covering power with non-scattering inks is to be achieved).

The opacity control can be used for example to determine the ratio of transparent white (blend) to opaque white.

9.2 Input of percentage for covering power

The following three options are available for input of a percentage under **Opacity control** in the **Formulation settings** window:

- **transparent** > 0%
- **opaque** > 100%
- **user-defined** > 0% to 100%

With the **transparent** setting, inks are calculated, which printed on black substrate are practically invisible (dE[w/b] = dE of target color on white compared with absolute black). The **opaque** setting gives preference to inks, which, when applied on white and black substrate, look practically the same (dE[w/b] = 0). The option **user-defined** permits an input between these two extreme values. The percentage requested is converted internally to a demand for dE[w/b] and is displayed above the color field in the main window after every formulation. The recipes can be sorted in the recipe selection window according to opacity (dE[w/b]) and opacity distance ddE[w/b] (difference between dE[w/b] requested and achieved).

The **transparent** setting is above all designed for translucent printing products such as luminous advertising, transparent packagings, viewing windows of touch panels, etc, while the **opaque** setting is mainly used where an ink is printed on a colored substrate or a transparent surface is to be covered in color.

9.3 Measurement of target color on white and black

Input of a percentage for covering power is omitted when the target color is present both on white and black substrate and work can be done with the setting **target color on white and black substrate**. During the formulation process a request for an additional measurement on black substrate is made after measurement on white substrate with this setting. Following the formulation, changeover can be made in the main window with the switch box above the color field between display of target color and recipe on white or black substrate. The recipes can be sorted according to opacity (dE[w/b]) and color distance on black substrate (dE[b]).

10 Using ink leftovers

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10.3 Converting a recipe into a leftover 80
10.4 Reducing leftovers 80

10 Using ink leftovers

10.1 General

Various methods can be applied to use ink leftovers:

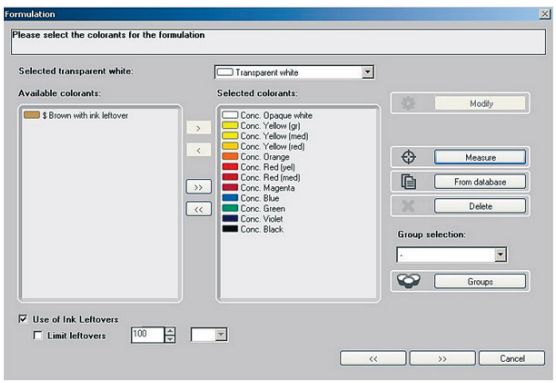
1. An ink leftover of unknown composition is available. The leftover is applied in a concentration of 100% (i.e. 100% ink leftover and 0% transparent white) and measured (see Section 10.2 “Formulating a target color with ink leftovers” or Chapter 15 “Processing and creating leftovers”). It is assumed that the leftover is printed on the same substrate as for the formulation. For recipes with a high proportion of the particular ink leftover, this procedure is accurate enough.
2. The ink leftover is stored in the database in the form of a recipe. During formulation, this is loaded and converted into a “colorant” (see Section 10.2 “Formulating a target color with ink leftovers” or Chapter 15 “Processing and creating leftovers”). This method is more accurate because the color components of the ink leftovers are known.
3. The ink leftover is measured by a colorant calibration and integrated into an existing assortment (see Section 14.4.3 “Defining an assortment”). Afterwards, the formulation proceeds as with a normal colorant (see Section 5.2 “Formulating a target color”). This method is the most expensive but it produces the most accurate recipes.

If you proceed in accordance with method 1 or 2, the leftovers will be taken into the current assortment during formulation and will be marked with a $ - sign.
In Method 3, the ink leftover is taken into the assortment like a normal colorant. In addition, you activate the check box **Is leftover** in the **Set up Colorant** window so that the colorant is marked as a leftover (see Section 14.4.3 “Defining an assortment”).

In any event, you must ensure that the ink leftovers are deleted from the assortments once they have been used up. You can delete ink leftovers either during formulation with ink leftovers in the **Colorant Selection** window (see Section 10.2 “Formulating a target color with ink leftovers”) or in the leftovers database (see Section 15.3 “Measuring a new leftover”). Note also Section 10.4 “Reducing leftovers”.

10.2 Formulating a target color with ink leftovers

During the formulation workflow you can activate the **Use of Ink Leftover** in the **Colorant Selection** window. The stored ink leftovers of the current assortment are displayed. If you activate the check box **Limit Leftovers**, then the leftovers are limit to the available quantities. The corresponding limitations on concentration are shown in the **Colorant selection** window and can be changed there if required.



On the right side three additionally buttons are displayed for modification of the leftovers.

10.2.1 Measuring ink leftovers or loading them from ColorNet

1. Click on **Measure** in the **Colorant Selection** window. The **Measure current ink leftover** window appears.
2. Define the ink leftover by measuring with the spectrophotometer or by loading from ColorNet.

Proceed as for the definition of a target color (see Section 5.2.3 "Defining a target color").

If the measuring mode in the current assortment is set to **On white and black** InkFormulation will ask for a measurement on white and black. If measurement on black is omitted, the program assumes that it is dealing with a transparent color.

The **Set up colorant** window now appears.

3. Enter a designation and the available quantity. Enter the remaining data (price, dye strength, specific gravity, viscosity, etc.) according to your requirements.

If the ink leftover was printed with a higher film thickness than the inks of the assortment, the dye strength of the ink leftover should be increased. The viscosity of the ink leftover (viscosity module only) is made the same as the viscosity of the assortment, provided no data were entered.

4. Click on **OK**. In the **Colorant Selection** window, the designation of the ink leftover is marked with a **$** - sign in the **Selected colorants** field.

10.2.2 Loading ink leftovers from the database

1. Click on Database in the Colorant Selection window. The recipe list displayed in the Database: Recipes window is automatically ordered in accordance with the dE X-Rite color distance to the current target color.

dE X-Rite is a quality criterion for using ink leftovers. Among other things, it takes into account the fact that it is very difficult to achieve a pure ink with a dirty ink leftover.

The recipe list displays all recipes of the current assortment used for formulation.

If you want to enter other criteria, you must click on **Search** and make the relevant entries in the **Search criteria** window.

2. Click on the desired recipe and then on **Select**. The recipe will be converted into an ink leftover and added to the current assortment. In the **Colorant selection** window the original designation of the recipe will then be displayed in the **Selected colorants** field, marked with a **$** - sign.

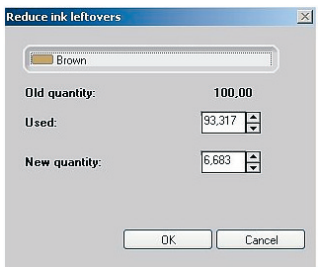
10.3 Converting a recipe into a leftover

The menu command **Recipe** > **Convert to leftover** can be used to convert an existing recipe into a leftover.

1. Load the recipe which you want to convert.
2. Click in the **Recipe** menu on **Convert to leftover.** The **Set up colorant** window appears.
3. Enter a designation and the available quantity.

The remaining information will be calculated automatically.

4. Click on **OK**, when you have made all the entries. The recipe will be converted into a leftover and added to the current assortment.



10.4 Reducing leftovers

When you have created a recipe with leftovers, you can automatically deduct the leftover quantities used in the recipe. Then only the reduced leftover quantities will be taken into account in the next formulation.

1. In the **Recipe** menu click on **Reduce leftovers.** The **Reduce leftovers** window appears.
2. Click on **OK**, when you accept the suggested values.

If more than one leftover is used in the recipe, these are deducted one after the other. Confirm each time with **OK**.

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11 CxF

11.1 CxF: General

CxF is a public standard created by X-Rite for color communication, the main purpose of which is the secure exchange of color information in digital form. The CxF format contains all the key information, and in particular the spectral values of the colors are transmitted.

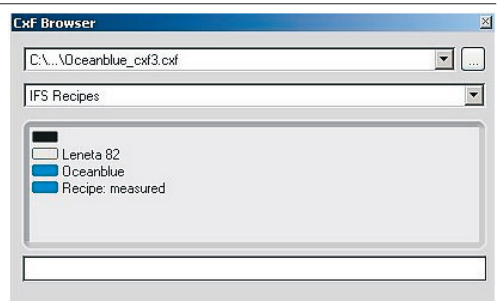
Once colors have been calculated, they can be exported from one X-Rite application (e.g. EyeOne Share) as a CxF file and then imported into another X-Rite application or – by using the CxF browser – connected and displayed.

For example, a color can be taken directly from the CxF browser into InkFormulation as the target color and then the formulation process can be started. Any difference in filter conditions between the CxF target color and the assortment used for formulation will be compensated for mathematically as far as possible.

11.2 Formulating with the CxF browser

Procedure:

1. Click on Browse in the CxF menu. The CxF browser window is displayed.
2. Select a file from the selection list or use the ... button to search for the file you need. The target colors (patterns) contained in the CxF file are displayed.
3. Select the target colors which you want to formulate.



In the filter field at the bottom of the window, you can enter one or more characters which appear in the description of the target color you are looking for, making it easier to find the one you want.

4. Click on Formulate. Then proceed in exactly the same way as when formulating a target color (see Section 5.2 “Formulating a target color”).

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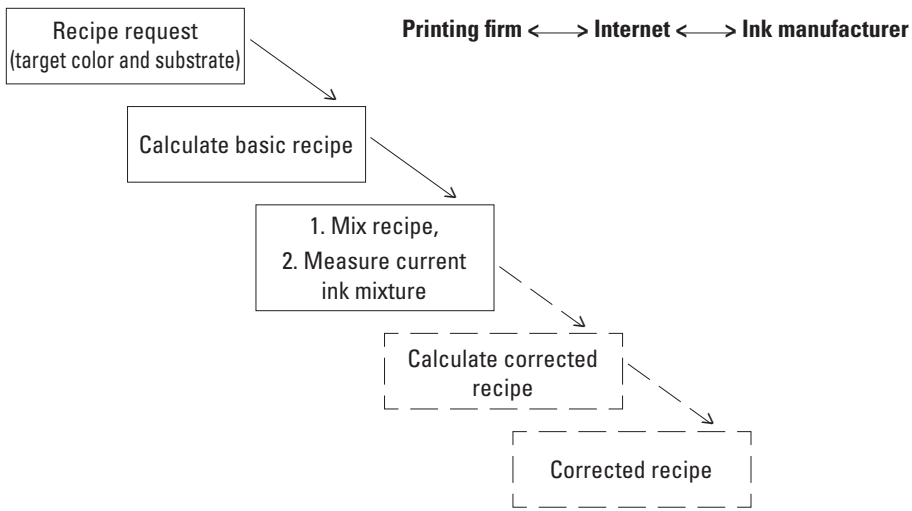
12 e-Recipe (only e-Recipe module)

Note: The module e-recipe is no longer available in InkFormulation 6. If you purchased the module for a previous version, you can use it in InkFormulation but only with Microsoft Outlook 2000/2003.

12.1 General

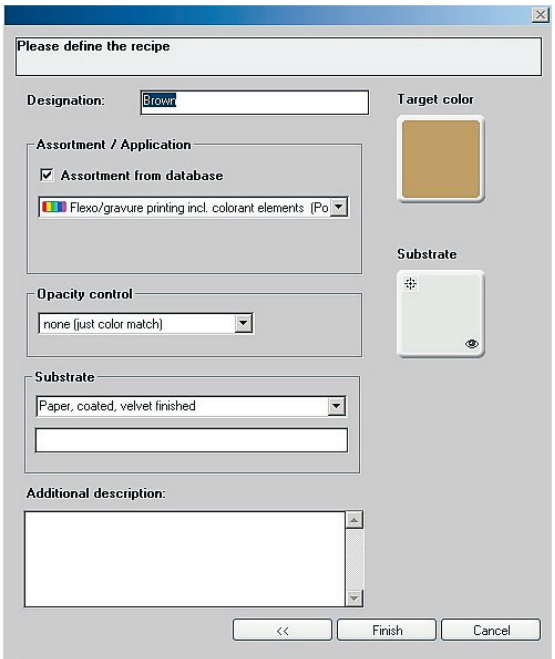
The e-Recipe module is used to transmit color specifications and recipes via the Internet between the printing firm, which defines and mixes the colors, and the ink manufacturer, who calculates and tests the recipe.



The following commands are available:

Symbol **"Inbox"** or menu command **e-Recipe > Inbox**	InkFormulation looks in the Inbox of your standard email program for recipe files (*.ifrx). You can load these recipes or formulate them directly.
e-Recipe > Recipe request	A target color with substrate can be defined and sent off.
e-Recipe > Send	The current target color and substrate can be sent off.
Symbol **"Reply"** or menu command **e-Recipe > Reply**	A recipe loaded in from the Inbox can be sent off directly after processing.

12.2 Recipe request



1. In the **e-Recipe** menu click on **Recipe request.**
2. Define the target color and the substrate as for formulating a basic recipe (see Section 5.2 “Formulating a target color”). Then the **Recipe request** window is displayed.
3. Make the required entries in the entry fields.

Assortment/Application: The current assortment is pre-selected. If the recipient is not using the same assortments, you can deactivate the check box and define the printing process in the selection fields which are then displayed.

Controlling the covering capacity: See Section 23.2 “Formulation settings”; the recipe is calculated according to this setting.

Substrate: you can choose the type of substrate in the selection field and enter additional information (e.g. name, manufacturer) in the entry field.

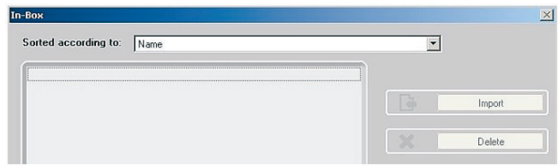
4. Click on **OK**. Your entries will be saved in an ASCII file *.ifrx and attached to the email.

The entries in the **Additional description field** go straight into the email as text and can subsequently be added to there.

5. Before sending complete the message with the address and any required text.

12.3 Inbox

InkFormulation searches in the Inbox of your standard email program for recipe files (*.ifrx). You can load these recipes or formulate them directly.



1. In the main window click on the **Inbox** symbol. A list of the recipes which have arrived will be displayed.

   When you click on a recipe in the list, an information window is displayed with a description of the recipe.

2. Continue with processing the recipe by clicking on the command buttons **Import**, **Formulate** or **Load recipe**.

   Import: The recipe is imported into the current folder.

   Formulate: The normal formulation procedure follows on directly (without definition of target color or substrate). The formulation settings are taken over from the recipe which has been loaded.

   Load recipe: The recipe is displayed in the main window, where you can process it as necessary.

3. After the recipe has been processed, the **Inbox** symbol changes to **Reply.** By clicking on the symbol you can immediately return the recipe.

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13 Managing recipes

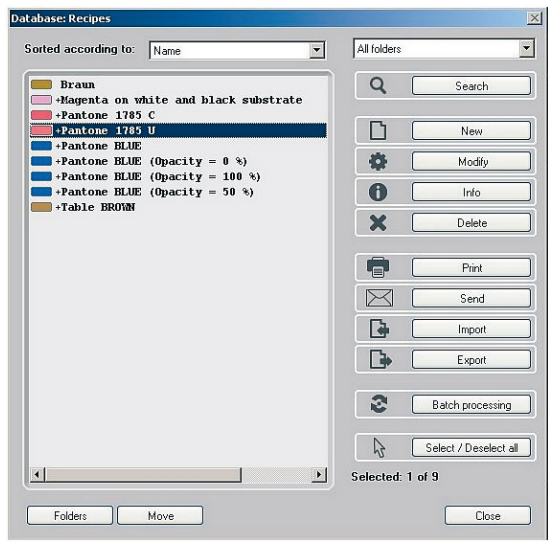
13.1 Opening database recipes

1. Click on **Recipes** in the **Database** menu. A list of all stored recipes is displayed on the left of the **Database: Recipes** window.

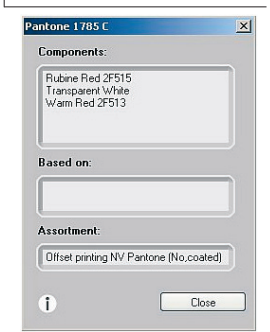
The name of the database and the current recipe folder are displayed in the title-line. If you want to change the folder, click on **Change folder** and select the required folder in the dialog window which is displayed. If you want to change the database, note Section 21.3 “Selecting a database”.

If you click on Move, you can move recipes into a different folder in the dialog window which is displayed.

The recipe list can be sorted according to various criteria (see Section 13.2 “Sorting recipe list”).



Recipe Info: If you select a recipe in the **Database: Recipes** window and then click on **Info**, an information appears about the components contained in the recipe. By clicking the up and down arrows on the keyboard, the components of the next higher or next lower recipe are displayed in the **Info** window. This provides the user with a quick survey without having to load the entire recipe every time into the main window.



13.2 Sorting recipe list

InkFormulation provides support with various sorting functions for the rapid location of an existing recipe. If a target color is already loaded in the main window, the recipe list can be sorted in the **Database: Recipes** window according to the following criteria:

Name	Recipe list in alphabetical order
Date/Time	Sorting according to date of recipe production
Target color (dE CIELAB) **Target color (dE X-Rite)**	Sorting according to color distance dE between the current target color and the target colors of the recipes.
Recipe (dE CIELAB) **Recipe (dE X-Rite)**	Sorting according to color distance dE between the currnt target colors and the recipe colors of the recipes.

dE X-Rite is a quality criterion for using ink leftovers. Among other things, it takes into account the fact that it is very difficult to achieve a pure ink with a dirty ink leftover.

1. Click in the **Sorted according to** field and then on the required option in the selection list.

If you click on the **Search** button, the **Search criteria** window appears. This enables you to reduce the number of recipes displayed on the basis of various criteria.

13.3 Processing an existing recipe

You can correct an existing recipe (e.g. you can modify the designation or the additional description).

1. Click on the recipe you want to process in the left area of the **Database: Recipes** window.
2. Click on **Modify**. The **Recipe Entry** window appears.
3. Click on the **Designation** or **Additional description** field in the **Recipe entry** window and make the desired entries.

For changes in the **Ink quantity** and **Ink film thickness** values, it is best to load the recipe and then modify it (see Section 5.5 “Modifying a recipe”). This gives you the chance to observe the effect of any changes (difference against the target color).

13.4 Batch processing

If an ink manufacturer has to replace a pigment he has been using hitherto with a new one, then all existing recipes produced using the assortment in question and containing the color in question will have to be recalculated using the substitute pigment.

Batch processing means that this process of replacement and recalculation, which would otherwise have to be carried out manually, can be automated and therefore greatly accelerated.

In a case like this, the ink manufacturer will create colorant calibrations for the color using the new pigment, enter these into the relevant assortment and then make the modified assortment available to those of his customers working with InkFormulation.

In an expanded search window, it is possible to filter out from all the saved recipes those containing the pigment which needs replacing, and to display them in a list.

In a second stage, you can specify in detail the conditions under which the recalculation of these recipes should take place. For example, the recipes can be recalculated and optimized while leaving the other colors in the recipe untouched. This is especially useful if the color difference between the old and new pigments is only slight.

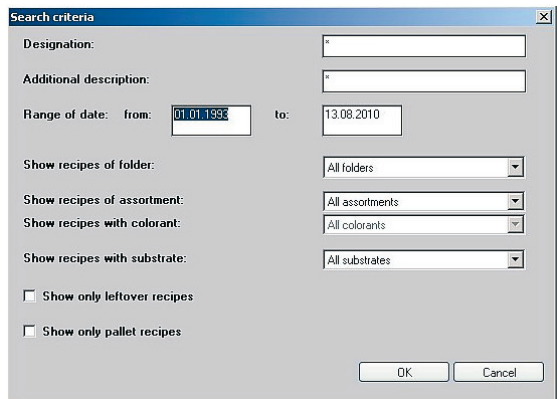
Following the recalculation, the modified recipes are listed again, showing the relevant Delta E values. This makes it possible to tell at a glance whether the modified recipes are acceptable in terms of accuracy or whether they should be recalculated again in different conditions, e.g. with all colors in the assortment available.

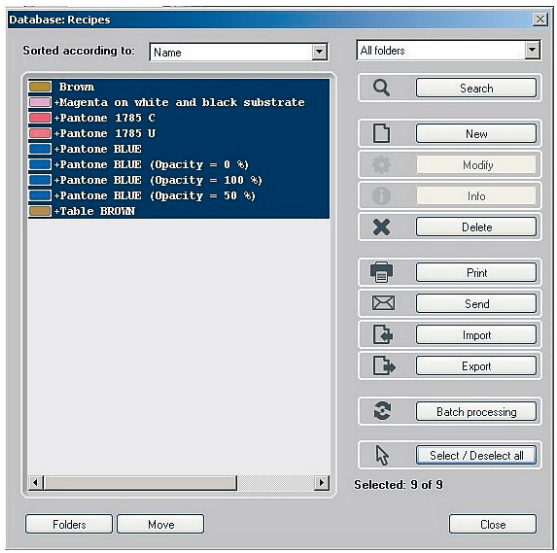
In any case, you must be aware that the recipes that have been calculated are theoretical recipes which should be printed out and tested again before next being used in production.

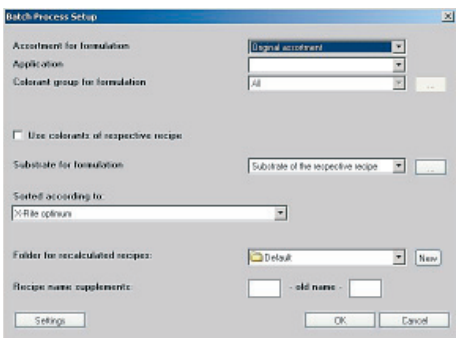
1. Click on **Search** in the window **Database: Recipes**. The window **Search criteria** is displayed.

Show recipes of folder: Select the folder to search for the recipes which need modifying. It is also possible to search all folders.

Show recipes of assortment: Select the assortment in which a pigment needs replacing.
Show recipes with colorant: Select the assortment colorant in which the pigment has been replaced.
Show recipes with substrate: Select a substrate if only recipes which have to be printed on a specific substrate should be included.
The search can be further restricted using the **Show only leftover recipes** and **Show only palette recipes** check boxes.



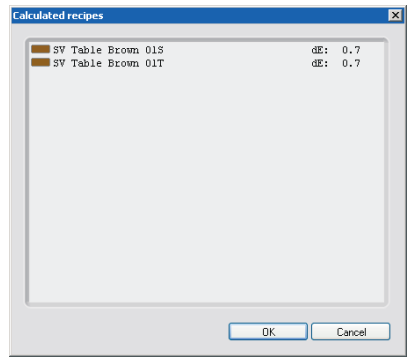




2. Enter the required search criteria and click on **OK**. The recipes corresponding to the search criteria will be displayed in the **Database: Recipes** window.
3. Highlight the recipes that you want to process.
4. Click on **Batch processing**. The **Batch Process Setup** window is displayed.

You can specify the conditions for the recalculation of the recipes:
Use colorants of respective recipe: Recommended if there is only a slight color difference between the new and old pigments.
You can also select the folder where the recalculated recipes should be saved, and a prefix or suffix for the previous recipe name, to distinguish between them if there are any further formulation settings to make.

5. Make the necessary entries in the **Batch Process Setup** window and click on **OK**. The selected recipes will be recalculated and displayed in the **Calculated recipes** window.
6. If the recipes meet your needs, click on **OK**. The **Database: Recipes** window comes up with the recipes in the folder which was selected for the batch processing. The old recipes can be deleted manually if necessary.



13.5 Sending recipes

In the **Database: Recipes** window you can select one or more recipes and send them by email by then clicking on **Send.** Please note Section 3.6.4 “Email”.

13.6 Deleting recipes

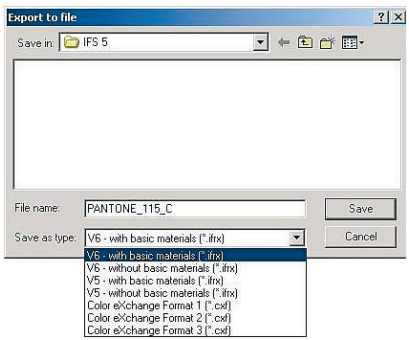
1. Click on **Recipes** in the **Database** menu. The **Database: Recipes** window will be displayed.
2. Click on the recipe to be deleted.

   If you want to delete several recipes, hold the CTRL key down and click on the recipes to be deleted.
3. Click on **Delete**. The recipes to be deleted will be displayed in the **Confirm deleting** window.
4. Click on **OK**. The recipes are deleted.

13.7 Exporting recipes

Various versions of the export file can be determined depending on the purpose of use:

V 5 (without basic materials)	Purpose: to permit transfer of recipes without information about basic materials to InkFormulation 5 users. All information about the basic materials is lost.
V 5 (with basic materials)	The exported file for InFormulation 5 has all data available.



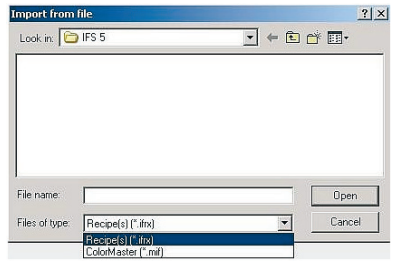
V 6 (without basic materials) Purpose: to permit transfer of recipes without information about basic materials to InkFormulation 6 users. All information about the basic materials is lost.

V 6 (with basic materials) The exported file for InkFormulation 6 has all data available.

1. Click on **Recipes** in the **Database** menu.
2. Click on the recipe you want to export.
   If you want to export several recipes together, hold the CTRL key down and then click on the recipes to be exported. These will be written to the same file when exported.
3. Click on **Export**. The **Export to file** window appears.
   In the **Filename** field, there will be a suggested designation, consisting of the first characters of the recipe designation and the file type of **.ifrx** or .**cxf**.
4. Select the file typ as well as the drive and the directory to which the file will be written.
5. Click on **OK**. The data will be converted into ASCII format and written to the relevant file.

13.8 Importing recipes

If assortments and recipes are to be imported, it is important to read in the assortments first and only then the recipes. Recipes can be imported from the InkFormulation 5 and 6. The imported recipes are saved as palette recipes (see Chapter 7 "Formulating with palette formulation").

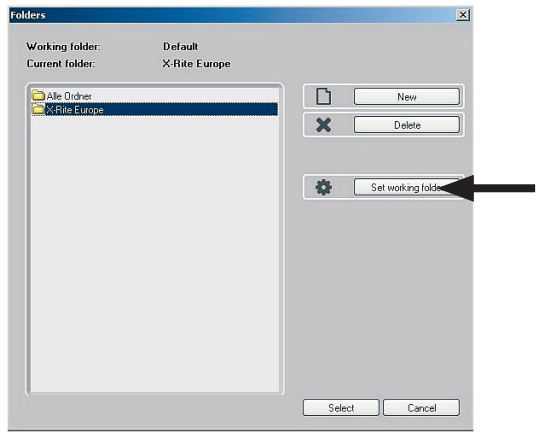


1. Click on **Recipes** in the **Database** menu. The **Database: Recipes** window is displayed.
2. Click on **Import**. The **Import from file** window appears.
3. Select the drive and the directory from which you want to import the file.

   The directory selected will display all ***.ifrx** und ***.mif** files.
4. Select the file to be imported.
5. Click on **OK**. The **Confirm import** window appears.
6. Confirm the import by clicking on **OK**. The name of the imported recipe appears in the list in the **Database: recipes** window.

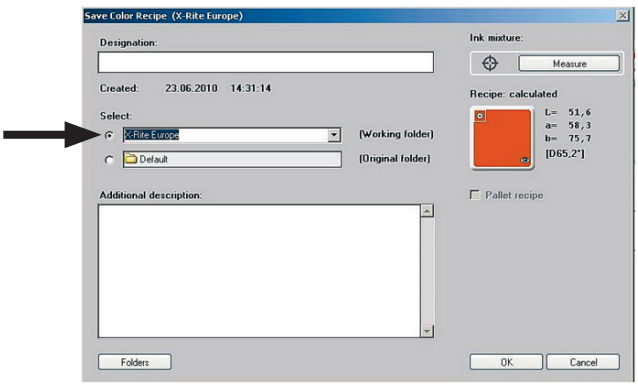
13.9 Recipe folder

The Recipe folder can be defined as a working folder. This folder is then automatically be preselected when saving recipes. The user can, however, select a different target folder at any time.



1. Click on **Recipe** in the **Database** menu. Database: **Recipes** window is displayed.
2. Click on **Folders.** The window **Folders** is opened.
3. Highlight the desired working folder and click **Set working folder**. The folder becomes the working folder for the currently logged on user.

The working folder is mentioned accordingly in the head area of the window. By clicking button Select this folder could, if wished, be additionally made the active folder.



The working folder's name appears in the title of the window. By choosing the **Select** option, the folder will be additionally become the active folder.

After saving recipes, the working folder is automatically selected as the target location for recipes to be stored. However, the user can select another target folder from the list box at any time.
By selecting the corresponding option, a recipe can also be stored back into the original folder.

In addtion to selecting a working folder, new folders can be created and existing folders deleted.

14 Processing and creating assortments

(definition of assortments module only)

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14 Processing and creating assortments

(definition of assortments module only)

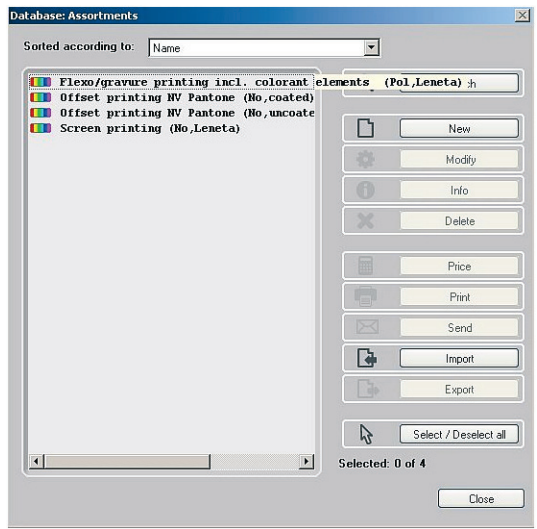
14.1 General

An assortment is a selection of colorants used to formulate a target color. Each assortment includes one or more transparent white and one substrate. The colorants in an assortment are measured by colorant calibrations and are so declared to the program (see Section 25.3 “Colorant calibration series”).

To process and create assortments, it is necessary to activate the “definition of assortments” modul (see Section 3.7 “Program versions and auxiliary modules”).

14.2 Opening database assortments

1. Click on **Assortments** in the **Database** menu. The **Database: Assortments** window appears.



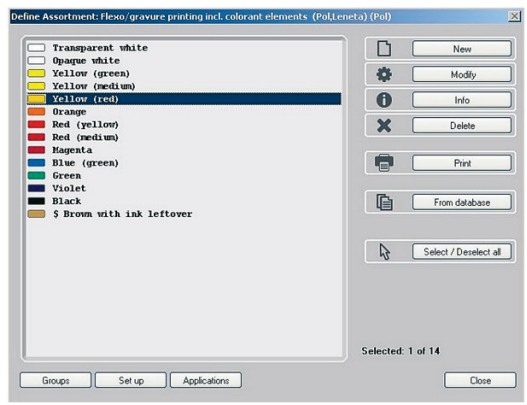
The name of the current database is shown in the title-line. If you want to change the database, note Section 21.3 “Selecting a database”.

On the left of the window, you will find an alphabetically sorted list of all the assortments stored. You can also sort the items by date of saving. Simply click on the **Sorted according to** field and select the **Date/Time** option.

You can use the **Price** button to enter or change the prices for the colors in the assortment (see also Section 23.2.3 “Recipe output”).

14.3 Processing an existing assortment

1. On the left of the **Database: Assortments** window, click first on the assortment you want to process and then on **Modify**. The **Define Assortment: xxx** window appears. You can now modify, add or delete the entries and measurement values of an existing assortment.



You can use Drag & Drop to alter the sequence of colors.

14.3.1 Modifying basic data

1. Click on **Set up** in the **Define Assortment: xxx** window. The **Set up Assortment** window appears.

Here, you can change or add to the designation or additional description of the assortment, as well as adding or deleting standard samples (concentration grades). Proceed in the same way as for the definition of a new assortment (see Section 14.4.2 “Preparing an assortment”).

2. Make the desired entries and then click on **OK**.

14.3.2 Processing colorants

1. In the **Define Assortment: xxx** window, click first on the colorant you want to process and then on **Modify**. The **Measure colorant: xxx** window appears.

Here, you can re-measure concentration grades, load them from ColorNet or delete them. Proceed in the same way as for the definition of a new assortment (see Section 14.4.3 “Defining an assortment”).

If you want to change the designation, the additional description or other general entries for the selected colorant, click on **Set up** and make the necessary entries (see Section 14.4.3 “Defining an assortment”).

If you click on **Diagnosis,** InkFormulation gives you a graphical view of the optical data of the colorant (see Section 14.4.5 “Diagnosis”). If you select a sample and click on **Display,** its reflection curve is displayed.

If you select a sample and click on **Deactivate,** this is marked and no longer included in the calculation for as long as it is deactivated.

2. Click on **OK** when you have made all your entries. You now return to the **Define Assortment: xxx** window.

14.3.3 Measuring a new colorant

You can also add a new colorant to an existing assortment.

1. If you wish, enter new concentration grades (see Section 14.4.2 “Preparing an assortment” and 14.4.3 “Defining an assortment”).

2. In the **Define Assortment: xxx** window, click on **Transparent white** or **New colorant**. The **Set up transparent white** or **Set up colorant** window appears. Now proceed in the same way as for the definition of a new colorant (see Section 14.4.3 “Defining an assortment”).

Any transparent white which is entered subsequently is treated as an additional transparent white.

14.3.4 Deleting a colorant from an assortment

You can delete a colorant from an assortment if you no longer want to use it (e.g. an ink leftover).

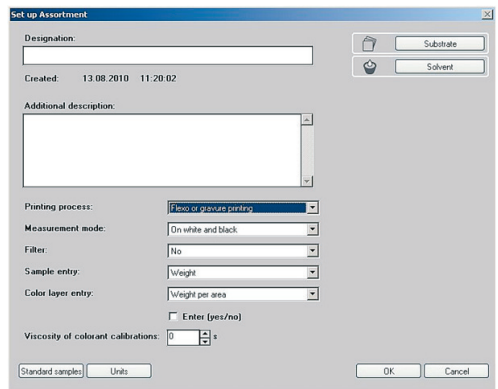
1. In the **Define Assortment: xxx** window, click first on the colorant you want to delete and then on **Delete**.
2. When the warning is displayed, click on **Yes** to confirm. The colorant is deleted.

14.4 Creating a new assortment

14.4.1 General

When you create a new assortment, you are first asked to enter basic data such as designation, printing process and concentration grades, before you can proceed with the definition of substrate, transparent white, and finally the colorants.

The physical measuring condition of the spectrophotometer is specifically assigned to the assortment. During formulation, the patterns must be measured with the same physical measuring condition as with the current assortment.



14.4.2 Preparing an assortment

1. Click on **New** in the **Database: Assortments** window. The **Set up assortment** window appears.
2. Enter the designation and additional description.
3. Select the printing process.

Various entry fields and buttons will be displayed, depending on the process selected:

Offset printing:
If you activate the **Enter yes/no** check box, a field is displayed which allows you to enter the target weight per area or the target film thickness for all calibrations of the colorants. If you make no entry, the program will assume that all measurements are based on the same weight per area.

Flexo or gravure printing (viscosity module only):
In the entry field the **Viscosity of colorant calibrations** enter the viscosity of the colorants included in the colorant calibration series in seconds (see Section 25.3.7 "Viscosity in flexo and gravure printing").

If you activate the **Enter (yes/no)** check box, in a selection field you can choose the calibration roller to be used for the colorant calibration series. You can process the selection list in the film thickness objects database (see Chapter 20 "Processing and creating film thickness objects").
In addition, the **Solvent** button is displayed. The solvent can be described more fully here (see Section 14.4.6 "Entering a solvent").

Screen printing:
If you activate the **Enter (yes/no)** check box, in a selection field you can choose the calibration screen to be used for the colorant calibration series. You can process the selection list in the film thickness objects database (see Chapter 20 "Processing and creating film thickness objects").

4. Select the measuring mode and define the remaining information for the assortment.

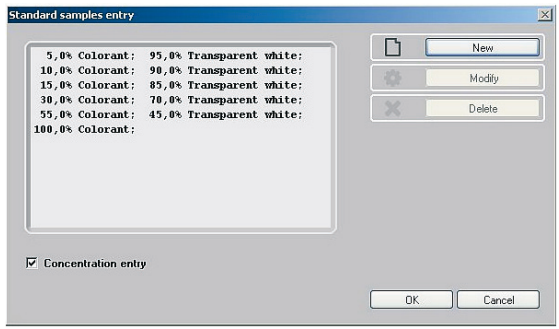
On white (transparent) or **On white (opaque):** If all the samples are transparent or all the samples are opaque, measurement on black is not necessary.

On white and black: If you are measuring opaque, semi-opaque (translucent) and transparent samples, you must measure on white and black.

5. Click on **Units** and select the units which you generally use for weight, weight per area/film thickness and specific weight.

You can also enter your own units. However, please note that no conversion is performed either with the standard units or with your own units.

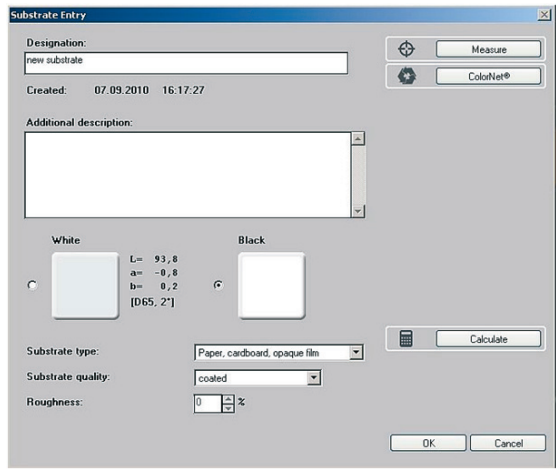
6. Click on **Standard samples**. The **Standard samples entry** window appears.
7. Enter the required grades.



Click on **New** and enter the new grade. If a black/opaque white has been defined, you have the option of also entering samples with black/opaque white.

If you have activated the check box **Enter concentration,** then when the ink concentration is entered the concentration of the transparent white is automatically made up to 100%. If the check box has not been activated, the composition of the sample can be entered in terms of quantities.

8. Click on **OK** when you have made all your entries. You now return to **Set up assortment** window.
9. Click on **Substrate**. The **Substrate Entry** window appears.



10. First enter the designation and additional description of the substrate and then click on **White.**
11. Prepare the spectrophotometer for measurement of the white substrate used for the colorant calibration series and click on **Measure**. Carry out the white calibration of your spectrophotometer if asked to do so and if necessary.

If you want to load a substrate from ColorNet, proceed as in Section 5.2.3.b “Loading a target color from ColorNet”. After measurement, the color of the substrate and its color values will be displayed at the bottom of the **Enter substrate** window.
The roughness of the white substrate is determined by the program during calculation of the optical data of the first colorant measured (see Section 17.3 “Defining a new substrate”).

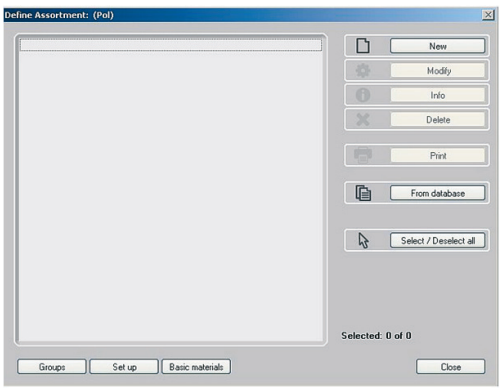
12. (Opacity module only) If you are working in measuring mode **On white and black,** you must measure the black substrate. Proceed as with Step 11.
13. Click on **OK** in the **Enter substrate window** and then in the **Prepare assortment** window. The **Define Assortment: xxx** window appears.

14.4.3 Defining an assortment

You are now ready to define transparent white and then colorants, opaque white (opacity module only) and black. The following section describes the process for defining a new colorant. The difference with transparent white is that only the 100% concentration grade exists.

In each case you must first define a transparent white before you can define a new colorant.

The first transparent white which you measure is the "Standard transparent white", which is used in calculating the colors of the assortment. Other transparent whites are treated like the other colors.

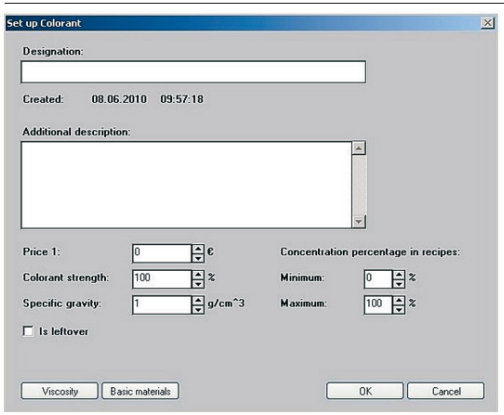


1. Click on **New** in the **Define Assortment**: xxx window. The window Colorant type entry appears. You can choose between
   - Transparent white
   - Opaque white
   - Black
   - New colorant

   If you define opaque white and black then you can subsequently also define samples which contain opaque white and black.

(viscosity module only): If you select **Flexo or gravure printing** as the printing process in the **Set up assortment** window, the **Viscosity** button is also displayed (see Section 14.4.7 "Entering a viscosity").

(basic materials module only): The **Basic materials** button is displayed in addition (see Section 14.4.8 "Division of assortment inks into basic materials").



2. Enter a designation and, if you wish, an additional description.
   If you do not enter a designation, a colorant designation derived from the colorant defined afterwards will be given automatically and displayed as the designation in the **Define Assortment: xxx** window.
3. Make the desired entries in the **Price**, **Dye strength**, **Specific gravity**, **Minimum** and **Maximum** fields.

Dye strength: To start with, leave the value at 100%. Then, if a colorant always seems to have a too high or low percentage in the recipe, you can increase or decrease the dye strength. However, be very careful when changing dye strengths!

Specific gravity:
If all the colorants (including transparent white) have about the same specific gravity, the value can be left at 1. The optical data (absorption and scattering) of the colorants are volume-related magnitudes but all the program entries are mass-related (i.e. established by weighing). For that reason, the specific gravity entry is necessary for the internal conversion.

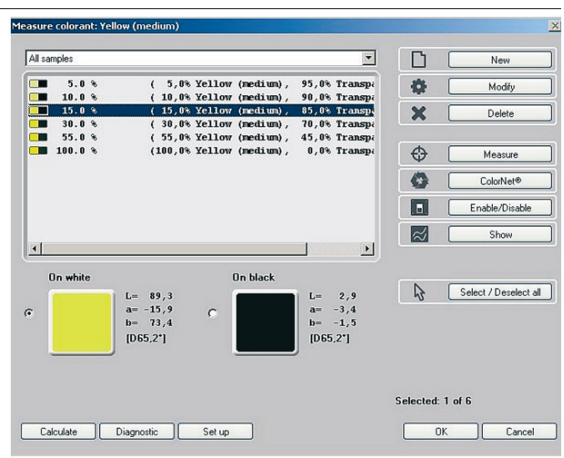
Concentration percentage in recipes:
The entries relate to the minimum and maximum permissible concentration of the colorant in a recipe and are kept permanently for formulation. If you have activated the **Colorant Selection before recipe calculation** (see Section 23.2 "Formulation settings"), you can temporarily change the entries made here (see Section 5.2.6 "Entering a concentration range").

4. If you are dealing with an ink leftover, activate the **Is leftover** check box. The designation of this colorant will then be marked with a **$** - sign in the **Define Assortment: xxx** window (see Chapter 10 "Using ink leftovers").

   In the **Available quantity** field you can enter the existing quantity of leftover.

5. Click on **OK**. The **Measure colorant: xxx** window appears.

   In the selection field for concentration grades you can choose which samples should be displayed.
   If you click on **New,** you can define special samples in addition to the standard samples. These samples are only valid for the selected colorant.
   If you click on a sample (concentration grade) and then on **De-/Activate,** the sample is marked and no longer included in the calculation, for as long as it remains deactivated.



6. Click on the sample you want to measure. The option **On white** is automatically activated.
7. Prepare the spectrophotometer for the measurement of the respective concentration grade of the colorant calibration and then click on **Measure**.

The measured samples are marked with a color, those which have not yet been measured are marked with a horizontal line. If you want to measure more samples, repeat the procedure from step 6.

If you want to load measuring values from ColorNet, click **ColorNet** and then proceed in the same way as for the definition of a target color (see Section 5.2.3.b "Loading a target color from ColorNet").

If you want to check the quality of the measured colorant calibration, please note Section 14.4.4 "Calculating optical data" and 14.4.5 "Diagnosis".

If you have selected **Offset printing** and entered an average weight per area/film thickness, it is possible to enter the corresponding value for the current sample in the entry field **Weight by area/film thickness** below the color field

(Only the opacity module) After measuring on a white substrate, the **On black** option is activated automatically, provided the measuring mode **On white and black** has been set.

8. Click on **OK** when you have measured all your samples. From the measurements InkFormulation calculates the optical data of the colorant and displays it in an information window.

The roughness of the white substrate is also determined during calculation of the optical data of the first colorant. For this reason, the process lasts slightly longer.

After the calculated data have been saved, the **Define Assortment: xxx** window reappears.

9. If you want to define other colorants, repeat the procedure from Step 1.
10. Once you have measured all the colorants, click on **Close**. The designation entered for the newly defined assortment will be displayed in the assortment list on the left of the **Database: Assortments** window.

14.4.4 Calculating optical data

From the measurements (reflections), InkFormulation calculates the optical data of the colorant (absorption and scattering capacity). By means of a theoretical back calculation to the color values of the individual samples, a conclusion can be reached about the quality of the colorant calibration. You can also check the effects, e.g. of a deactivated sample.

1. In the **Define assortment: xxx** window select the color for which you want to check the optical data and click on **Process.**
2. If you wish, make the changes in the **Measure color: xxx** window of which you want to check the effects.

If for example a sample causes a large color distance, select this one and click on **Deactivate.** The sample will be marked and no longer included in the calculation while it remains deactivated.

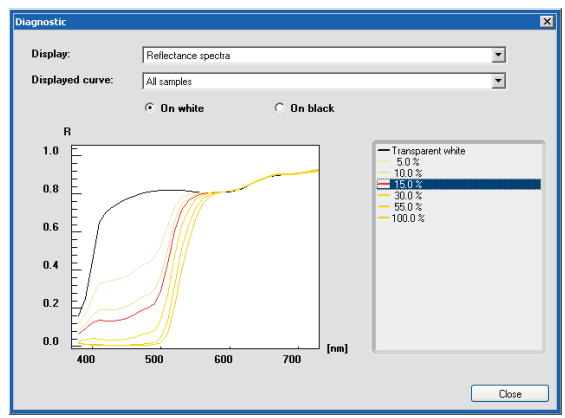
3. Click on **Calculate.**
   In an information window InkFormulation tells you the color distances for the individual samples, together with the maximum and minimum color distance of the colorant calibration.

14.4.5 Diagnosis

When the spectra are displayed you will at a glance have a good overview of the quality of the colorant calibration which has been measured.

1. In the **Define assortment: xxx** window select the colorant for which you want to check the spectra and click on **Process.**
2. Click on **Diagnosis** in the **Measure colorant: xxx** window.

In the key field on the right you can click on an entry to highlight the relevant curve in color. By selecting the **On white** or **On black** option the relevant curves are displayed.



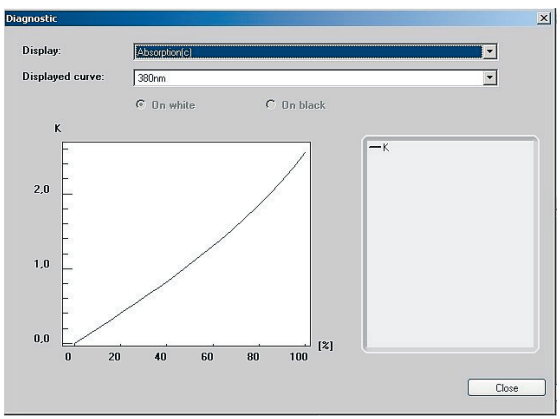
The following display options can be selected:

Display	**Displayed curve**
Reflection spectra	All samples or a selection
Curve comparison	Comparison between measured and calculated curve
Density spectra	All samples or a selection
k-, s- spectra	Model parameters “k1 and s1”, “k1”, “s1”, “1/(1+k2)” or “1/(1+s2)”
Absorption(c)	A selectable wavelength
Scattering (c)	between 380 and 730nm

Spectra are shown in relation to wavelength (380 - 730nm). Values shown in relation to concentration are marked with a (c).

The model parameters of the display **k-, s- spectra** have the following meanings:

k1 Parameter for the strength of the absorption
k2 Parameter for the attenuation of the absorption
s1 Parameter for the strength of the scattering
s2 Parameter for the attenuation of the scattering



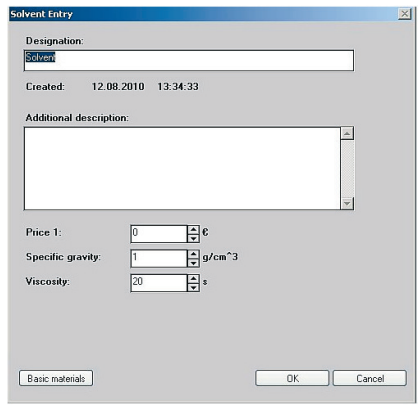
If for example in the selection field **Display** you click on **Absorption (c),** curves similar to the following will be displayed, depending on your measurements.

14.4.6 **Entering a solvent** (viscosity module only)

The solvent can be described more fully here. Data such as price, specific gravity and viscosity can be given. The viscosity of the solvent is also taken into account when calculating the viscosity curves of the inks.

(basic materials module only): The composition of the solvent can be described via the **Basic materials** button (see Section 14.4.8 “Division of assortment inks into basic materials”).

1. Click on **Solvent** in the **Set up assortment** window.
   The **Solvent Entry** window appears.



The **Solvent** button is only displayed if the **Flexo/gravure printing** process was selected.

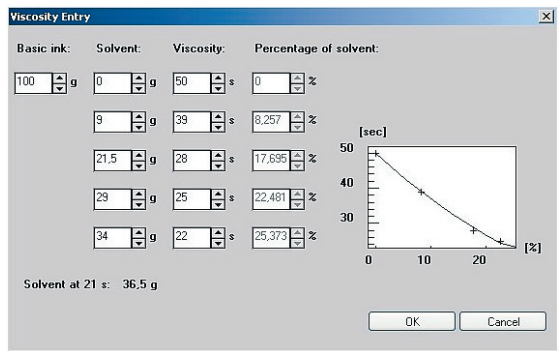
2. Enter the values determined in the **Price**, **Specific gravity** and **Viscosity** fields.

14.4.7 **Entering a viscosity** (viscosity module only)

Following input of the viscosity curves for the inks and transparent white (blend) of the assortment, the program is able to calculate recipes for any desired target viscosities. It should be noted that a viscosity (see Section 25.3.7 “Viscosity in flexo and gravure printing”) and a solvent are assigned to every flexo/gravure printing assortment.

The proportion of solvent is determined by the program using quantity data. This removes the conversion to percentages of the solvent proportion as a source of error. The program provides information about the deviation of the points entered from the theoretical curve.

1. Click on **Viscosity** in the **Set up colorant** window.
   The **Viscosity Entry** window appears.



2. Enter your data in the **Basic ink**, **Solvent** and **Viscosity** fields.

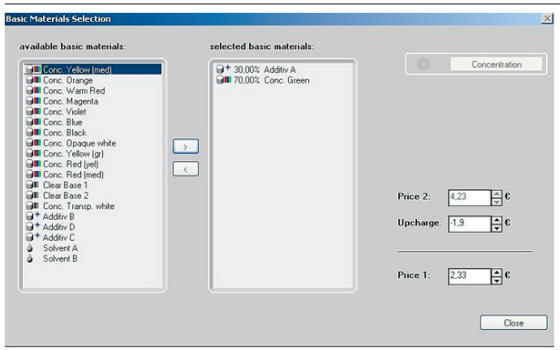
In the top line, enter the quantity and the viscosity of the basic ink (100% basic ink, 0% solvent). Enter further points for the relevant range of viscosity underneath. The viscosity data for the solvent (0% basic ink, 100% solvent) is entered in the **Solvent Entry** window (see Section 14.4.6 “Entering a solvent”). If the viscosity of the solvent is specified there, two points are sufficient to determine the viscosity curves of the inks. Otherwise at least three are required. However: the more entries in the relevant range of viscosity the better.

14.4.8 Division of assortment inks into basic materials
(basic materials module only)

When a basic materials database has been compiled, the inks of the assortment can be assigned their relevant basic materials in the **Set up colorant** window.

The basic materials contained and the surcharge are allocated here to the ink (basic ink in viscosity module). Following every selection of a basic material, an automatic request is made to enter the percentage proportion (percent by weight).

(viscosity module only): The solvent of the assortment used for the viscosity calculation can similarly be split into its basic materials. These are normally further solvents, which should always occur in the same ratio in the print ready ink.



1. Click **Basic materials** in the **Set up colorant** window.
   The **Basic Material Selection** window appears.
2. Double-click on the required basic material in the **available basic materials** field. The **Settings** window is then displayed.
3. Enter the value of concentration (percent by weight) and click on **OK**.
   The basic material selected is then displayed in the **selected basic materials** field with the concentration entered.
4. Make the required input in the **Upcharge** field.

The price for print ready inks (P1) or the basic materials price (P2) is displayed in the main window corresponding to the recipe output selected (see Section 23.2 “Formulation settings”). If inks occur in the recipe which are not further divided into components (e.g. ink leftovers) the mixture price (P) comprising prices of basic materials and inks is displayed in the case of basic materials display.

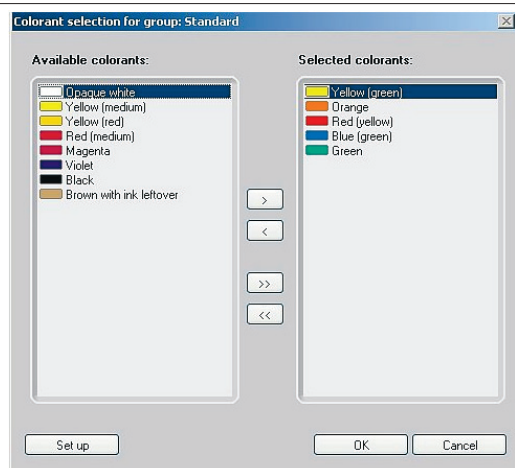
Basic materials price (P2): This price comprises the prices for the basic materials of the ink and only appears as output field in the **Basic materials selection** window. Input of prices for the basic materials is performed in the basic materials database (see Section 18.4 “Defining a new basic material”). If the basic materials prices are not yet defined, a zero is entered for **Price 2**.

Print ready inks price (P1): This price comprises the sum of basic materials price and surcharge after determining the surcharge. If the print ready inks price is entered instead of the surcharge, the surcharge is adapted automatically. It is immaterial whether the print ready inks price is entered in the **Basic materials selection** or **Set up colorant** window. The input fields are mutually coupled and are updated each time.

14.4.9 Forming color groups

You can form colors which you always use together in formulation into a group. You can also only define this during formulation in the **Color selection** window.

1. Click in the **Database** menu on **Assortments**
2. In the **Database: Assortments** window, select the required assortment and click on **Process.**
3. In the **Define assortment: xxx** window click on **Groups.**
4. In the **Define groups** window click on **New**, enter a designation and additional description in the **Set up group** window and click on **OK**. The window **Colorant selection for group: xxx** is displayed.
5. Select the colors which you want to put into a group.
6. Click on **OK**. The new group is displayed in the list in the **Define groups** window



14.5 Deleting assortments

You can delete an assortment which you no longer need. Note, however, that recipes produced with this assortment lose access to the optical data of the colorants included.

1. Click on **Assortments** in the **Database** menu. The list of assortments will be displayed on the left of the **Database: Assortments** window.
2. Click on the assortment you want to delete.
3. Click on **Delete**. The **Confirm deleting** window appears.
4. Click on **OK**.

14.6 Sending assortments

In the **Database: assortments** window you can select one or more assortments and then send them by email by clicking on **Send**. Please refer to Section 3.6.4 “Email”.

14.7 Exporting assortments

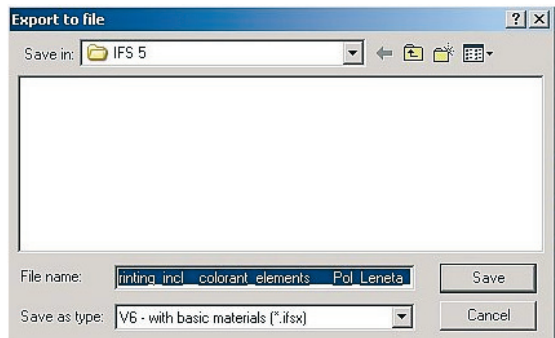
Various versions of the export file can be determined depending on the purpose of application:

V 5 (without basic materials)	Purpose: to permit transfer of assortments in Version 5.0 to InkFormulation 5 users information about basic materials. All information about the basic materials is lost.
V 5 (with basic materials)	The exported file for InkFormulation 5 has all data available.
V 6 (without basic materials)	Purpose: to permit transfer of assortments InkFormulation 6 users without information about basic materials. All information about the basic materials is lost.
V 6 (with basic materials)	The exported file for InkFormulation 6 has all data available.

1. Click on **Assortments** in the **Database** menu.
2. Click on the assortment you want to export in the **Database: Assortments** window.

If you want to export several assortments together, hold the CTRL key down and then click on the assortments to be exported. When exported, they will be written to the same file.

3. Click on **Export**. The **Export to file** window appears.

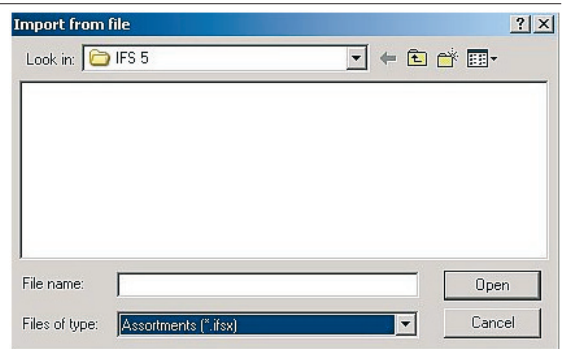


In the **Filename** field, there will be a suggested designation, consisting of the first characters of the assortment designation and the suffix **.ifsx**, if you have selected a single assortment, or ***.ifsx**, if you have selected several assortments. In the latter case, you must enter a designation instead of the *.

4. Select the file typ as well as the drive and the directory to which the file will be written.
5. Click on **OK**. The data will be converted into ASCII format and written to the relevant file.

14.8 Importing assortments

1. Click on **Assortments** in the **Database** menu.
2. Click on **Import**. The **Import from file** window appears.



3. Select the drive and the directory from which you want to import the file.

The directory selected will display all ***.ifsx** and ***.mif** files.

4. Select the file to be imported.
5. Click on **OK**. The **Confirm import** window appears.
6. Confirm the import by clicking on **OK**. The name of the imported assortment appears in the list in the **Database: Assortments** window.

15 Processing and creating leftovers

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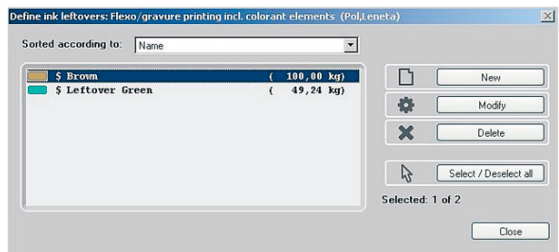
15 Processing and creating leftovers

15.1 General

This is not properly speaking a database but a way of quickly accessing the leftovers of the current assortment and their available quantities. New leftovers can be quickly measured. The process is similar to Section 10.2.1 “Measuring ink leftovers or loading them from ColorNet”, but in addition the substrate can also be defined.

15.2 Opening the leftovers database

1. Click on **Leftovers** in the **Database** menu. The **Define leftovers** window appears.



A list of the leftovers for the current assortment is displayed, together with their available quantities.

With **New** you can measure a new leftover (see Section 15.3 “Measuring a new leftover”).

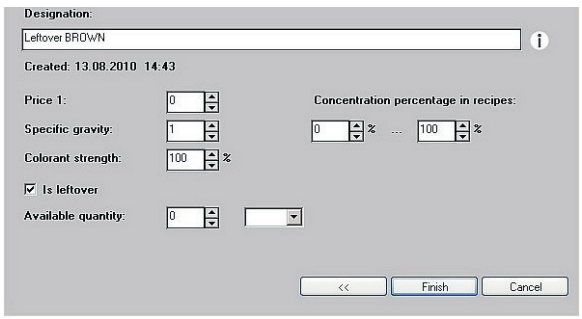
With **Modify** you can change data relating to the selected leftover, in particular the available quantity.

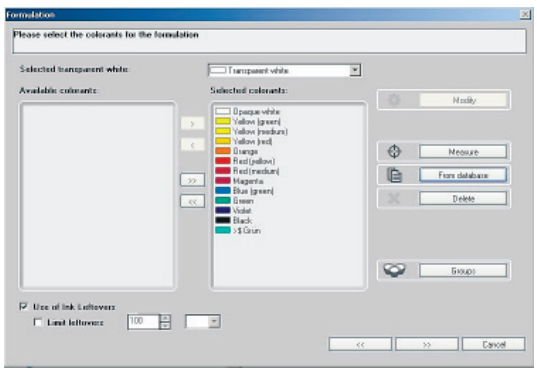
With **Delete** the selected leftover is deleted.

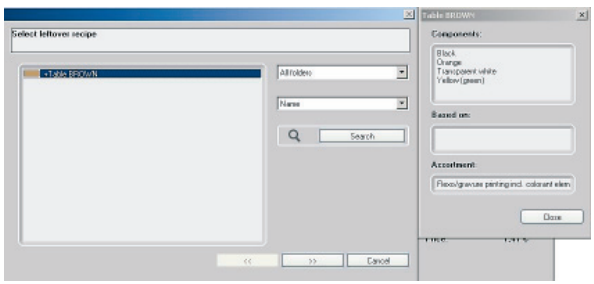
15.3 Measuring a new leftover

Here you can only measure one concentration grade. If you want to measure several concentration grades, proceed as for measuring a normal color (see Section 14.4.3 “Defining an assortment”).

1. Click on **New** in the **Define leftovers.** The **Measure leftovers** window appears.
2. Set up the spectrophotometer to measure the leftover and click on **Measure**.







If for the current assortment the measuring mode is set to **On white and black,** InkFormulation requests a measurement on white and black. If the measurement on black is omitted, the program assumes that this is a transparent color.

3. Define the substrate.
4. In the **Set up colorant** window enter a designation and the available quantity and make any other necessary entries.
5. Click on **OK**. The leftover is displayed in the list of the **Define leftovers** window.

In addition to measuring the ink leftover in the database you can define waste inks in two different ways:

1. You convert a measured recipe to an ink leftover.
   a. Load a measured recipe from the database.
   b. Click on **Convert to ink leftover** in the menu **Recipe**.

Note: Only measured recipes can be converted to an ink leftover. The function is disabled when the recipes are only calculated.

2. During the formulation workflow you activate the use of ink leftover. In the Colorant Selection window you enable the use of the leftovers. In addition to already defined ink leftovers you can:
   a. Measure a leftover or;
   b. Load a measured recipe from the database.

16 Applications

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16 Applications

16.1 General

In the applications database you can define applications for the current assortment. These additives have to been defined in the database basic material before.
If you define more than 1 application for the assortment, you can change your additives for the recipe during the formulation workflow.

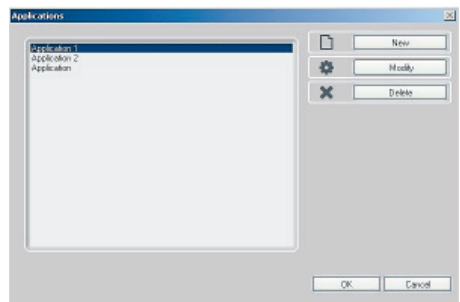
In the assortment you can define how to use the applications. When creating a new or modifing an existing application the user can select from the following three options:

1) User can't change application
   No selection is available.
2) User can change application
   Selection of defined applications is possible
3) User is allowed to change additive combinations
   Selection of defined or creating new applications are allowed

16.2 Opening database applications

1. Click on **Applications** in the **Database** menu. The Database: **Application**s window appears.

On the left side of the window is a list of all stored applications for the current assortment.

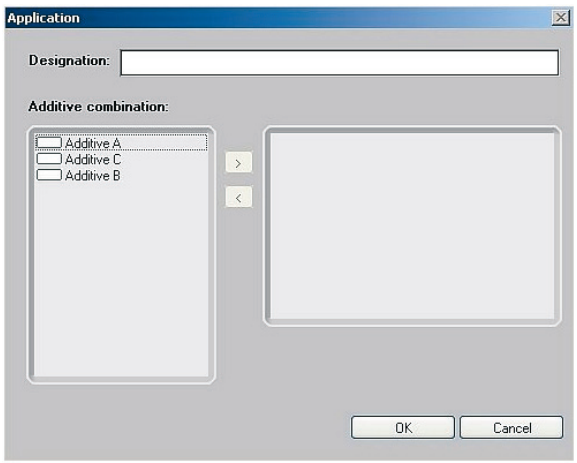


16.3 Processing an existing application

1. In the list on the left of the **Database: Applications** window, click on the application you want to process.
2. Click on **Modify**. The **Applications** window for modify appears.

Here, you can change or supplement the designation, exchange the additives and the percentage. Proceed in the same way as for the definition of a new application (see Section 16.4 "Defining a new application").

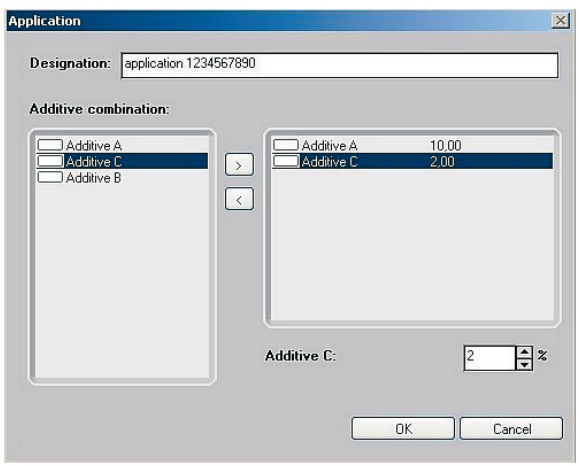
16.4 Defining a new application



1. Click on New in the Database: **Application**s window appears. The **Application** window appears.
2. Make the desired entries in the designation.
3. Select the desired additives from the left list and transfer via arrow or double click to the right list.
4. Define the percentage for the additives in the right list.
5. Finalize the entries by clicking **OK**.

The new application is listed in the Database: Applications window.

16.5 Deleting an application



1. Click on **Applications** in the **Database** menu. The Database: **Applications** window appears.
2. Click on the application to be deleted.
3. Click on **Delete**.

The application is deleted.

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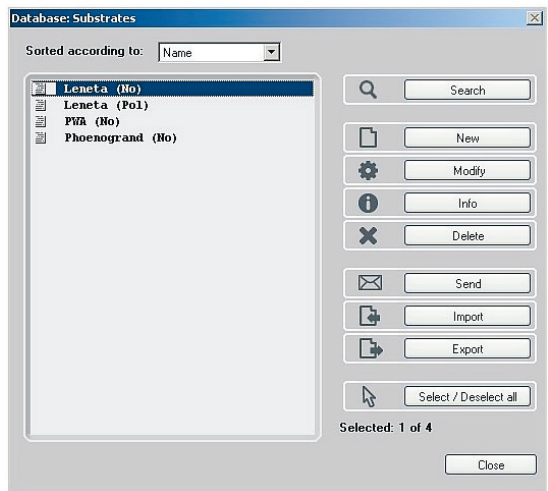
17 Processing and creating substrates

17.1 Opening database substrates

1. Click on **Substrates** in the **Database** menu. The **Database: Substrates** window appears.



The title line shows the name of the current database. If you want to change the database, please note Section 21.3 “Selecting a database”.

On the left of the window is an alphabetically ordered list of all stored substrates. You can also sort them by date of saving. Simply click on the **Sorted according to** field and select the **Date/Time** option.

17.2 Processing an existing substrate

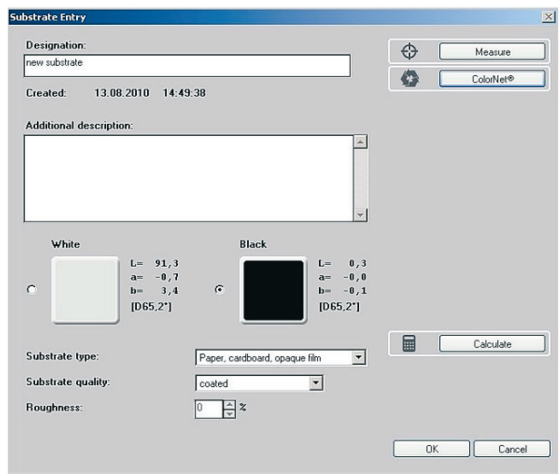
1. In the list on the left of the **Database: Substrates** window, click first on the substrate you want to process and then on **Modify**. The **Substrate Entry** window appears.

   Here, you can
   - change the designation or additional description.
   - change the substrate quality.
   - redefine the substrate by measuring with the spectrophotometer, or loading from ColorNet.

Proceed in the same way as for the definition of a new substrate (see Section 17.3 “Defining a new substrate”).

17.3 Defining a new substrate

1. Click on **New** in the **Database: Substrates** window. The **Substrate Entry** window appears.



2. Make the desired entries in the **Designation** and **Additional description** fields.

3. Click on the field **Substrate type**. From the list, select those which correspond to the substrate type to be defined. Depending on the substrate type, different entry fields are displayed.

Paper, cardboard, opaque film

If you select **User-defined** for the substrate quality, you can enter the roughness value of the substrate to be measured in the **Roughness** entry field.

As well as the hue (remission) of a substrate, the surface quality plays an important role. Under the microscope, a rough substrate appears as a land¬scape of mountains and valleys. When ink is applied, the mountains of the substrate shine through and the color is quite different (i.e. less saturated) from that on a smooth substrate. InkFormulation seeks to take account of this factor through a roughness value. In establishing the colorant calibrations, the roughness of the assortment substrate is calculated on the basis of the data for the first colorant. In defining a new substrate, it is left to you to enter a plausible value.

Roughness 0% = smooth surface
Roughness 100% = Roughness in the order of magnitude of the film thickness of the ink

For the **Calculate** button, please note Section 17.4 “Calculating roughness“

Metalized

This substrate type is only available for sphere spectrophotometer, since this substrate type requires such an instrument.

Transparent Film:

If formulation is to take place on transparent film, then the background material for measuring is very important. It is obvious that, when measuring a transparent film, the color of the background material will also be included in the measurement. It is therefore essential to ensure that the same white background is always used. Ideally, a painted white Leneta card or a neutral white ceramic tile should be used. Paper, for example, is quite unsuitable, because it contains optical brighteners.

4. Prepare the spectrophotometer for the measurement and click on **Measure**.
   After measuring, the substrate color and the related color values will be displayed in the lower part of the **Substrate Entry** window.

If the measuring mode **On white and black** has been selected, a black-white substrate (contrast substrate) must be measured. If the black substrate is not measured, InkFormulation takes the black of the assortment substrate. This applies to all measurements where a black substrate is required.

If you want to load a substrate from ColorNet, proceed in the same way as in Section 5.2.3 b “Loading a target color from ColorNet”.

5. Click on **OK**. You return to the **Database: Substrates** window. The designation of the newly defined substrate is displayed on the left of the window.

17.4 Calculating roughness

With InkFormulation it is possible in certain circumstances to use a color assortment which was defined on a non-absorbent substrate (on a substrate with a sealed surface such as Leneta cards, coated paper or white, opaque plastic film), for formulations on absorbent substrates (e.g. on uncoated papers).

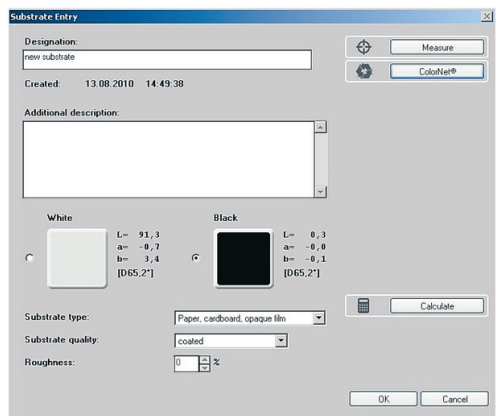
The purpose of this option is so that a color assortment can be used not only for one particular formulating condition, but as universally as possible, i.e. also on substrates with different physical surface properties. This can help reduce the considerable expense involved in creating assortment colorant calibrations, because a separate assortment does not have to be created for each substrate type.

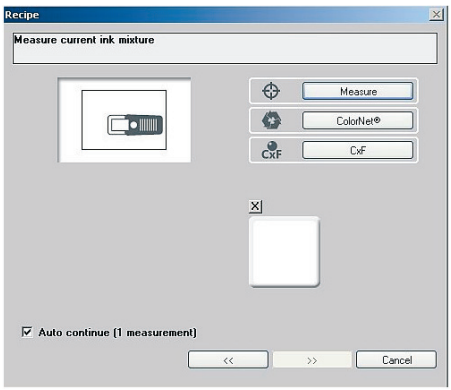
Before this function can be used, it must be calculated for the absorbent substrate to what extent the ink soaks into the substrate after printing. InkFormulation is able to use this function to calculate the extent to which the printing ink has soaked into the substrate (absorption behavior). In the program, this absorption behavior is described using the term “roughness“. This necessitates creating a so-called “known recipe“ which is mixed using colors in the assortment in question.

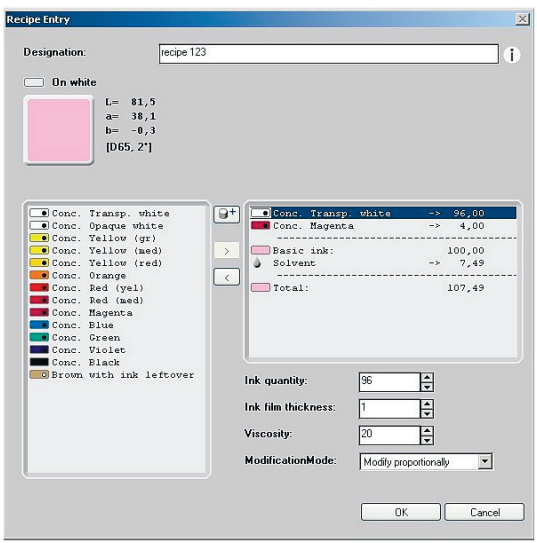
1. Create an ink mixture for which you know the exact proportions for how much of each color it contains.

X-Rite recommends creating a green for this purpose, consisting for example of a mixture of green and transparent white, or a mixture of blue, yellow and transparent white. When printed, this color should not be too light or too dark, i.e. it should ideally have a brightness value L* of approx. 50.

2. This ink mixture is printed on to the absorbent substrate (e.g. uncoated paper). It is important that the printing conditions correspond to those in practice (ink layer thickness, viscosity).
3. Define a new substrate (see Section 17.4 “Calculating roughness“).
4. Click on **Measure** to measure the ink in the substrate resulting from printing the ink mixture.







5, Click on **Calculate**.

6. Select the assortment. The defined current ink mixture window is displayed.

7. Click on **Measure** to measure the ink mixture. After measuring, the **Recipe Entry** window is displayed.

8. Enter the quantities or percentages of the colors contained in the recipe and click on **OK**.
   The program calculates the roughness associated with this substrate and shows it in a window as a percentage value.

9. By clicking on **OK**, the roughness which has been calculated is automatically assigned to the current substrate.

The roughness value which is calculated is an approximate value. If the results of formulation are not satisfactory, you can try to improve them by slightly varying the roughness value.
Now the assortment which was created on a non-absorbent substrate can be used in practice for formulation on an absorbent substrate. When defining the substrate during formulation, this substrate can now be selected from the substrate database. However, it is essential that the substrate which is to be used corresponds both in color and in surface properties (roughness) to that saved in the substrate database.

The opposite is also possible, namely that an assortment created on an absorbent substrate can be used for formulation on a non-absorbent substrate. To do this, the non-absorbent substrate must be entered in the substrate database with a roughness factor of 0 (zero).

17.5 Deleting substrates

1. Click on **Substrates** in the **Database** menu. The list of substrates is displayed on the left of the **Database: Substrates** window.
2. Click on the substrate you want to delete.
3. Click on **Delete.** The window **Confirm delete** is displayed.
4. Click on **OK**. The selected substrate is deleted.

17.6 Sending substrates

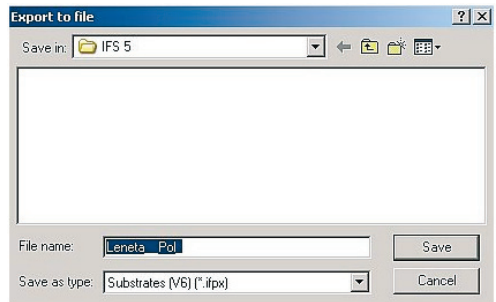
In the **Database: substrates** you can select one or more substrates and send them by email by then clicking on **Send.** Please note Section 3.6.4 “Email”.

17.7 Exporting substrates

1. Click on **Substrates** in the **Database** menu.
2. Click on the substrate you want to export in the **Database: Substrates** window.

If you want to export several substrates together, hold the CTRL key down and then click on the substrates to be exported. When exported, they will be written to the same file.

3. Click on **Export**. The **Export to file** window appears.

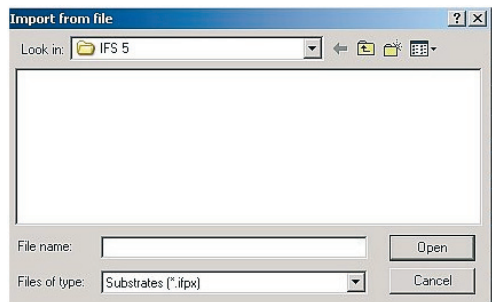


In the **Filename** field, there will be a suggested designation, consisting of the first characters of the substrate designation and the file type or **cfx**.

4. Select the drive and the directory to which the file will be written.
5. Click on **OK**. The data will be converted into ASCII format and written to the relevant file.

17.8 Importing substrates

1. Click on **Substrates** in the **Database** menu.
2. Click on **Import**. The **Import from file** window appears.
3. Select the drive and the directory from which you want to import the file.



The directory selected will display all ***.ifpx** and ***.ifp** files.

4. Select the file to be imported.
5. Click on **OK**. The **Confirm import** window appears.
6. Confirm the import by clicking on **OK**. The name of the imported substrate appears in the list in the **Database: substrates** window.

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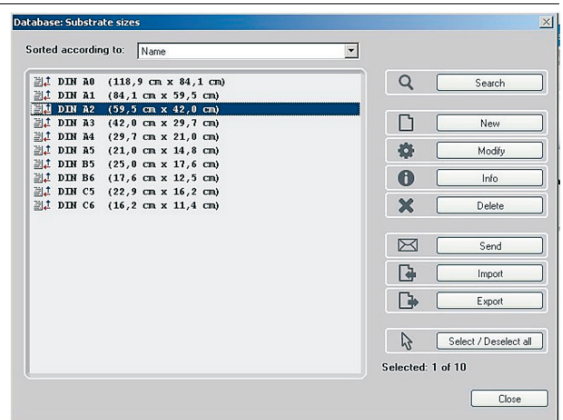
18 Processing and creating substrate formats

18.1 General

If you enter the substrate formats which you normally use, then after formulation, you can calculate the ink quantity needed for a particular print job (see Section 5.3 “Calculating the ink quantity”)

18.2 Opening database substrate formats

1. Click on **Substrate sizes** in the **Database** menu. The **Database: Substrate sizes** window appears.

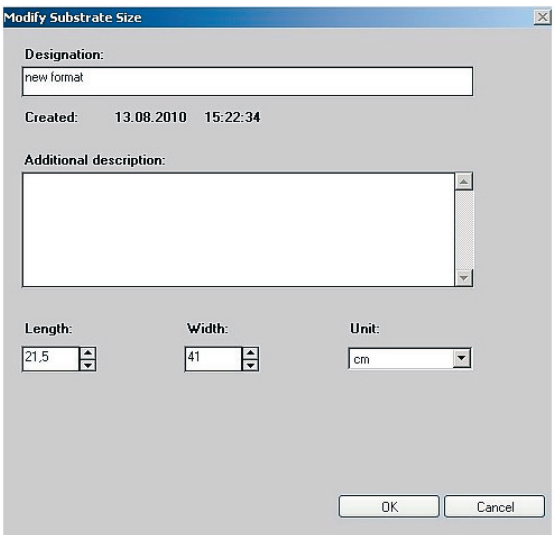


The title line shows the name of the current database. If you want to change the database, please note Section 21.3 “Selecting a database”. On the left of the window is an alphabetically ordered list of all stored substrate formats. You can also sort them by date of saving. Simply click on the **Sorted according to** field and select the **Date/Time** option.

18.3 Processing an existing substrate format

1. In the list on the left of the **Database: Substrate sizes** window, click on the substrate format you want to process.
2. Click on **Modify**. The **Modify substrate size** window appears.

Here, you can change or supplement the designation, the additional description, the substrate length and width or the unit. Proceed in the same way as for the definition of a new substrate format (see Section 18.4 “Defining a new substrate format”).



18.4 Defining a new substrate format

1. Click on **New** in the **Database: Substrate sizes** window. The **Modify substrate size** window appears.
2. Make the desired entries in the **Designation** and **Additional description** fields.
3. Click in the **Unit** field. Select the desired unit (**cm** or **inch**) from the list.
4. Click in the **Length** and **Width** fields and make the desired entries.
5. Click on **OK** when you have finished making your entries. You return to the **Database: Substrate sizes** window. The designation and the dimensions of the newly defined substrate format are displayed on the left of the window.

18.5 Deleting substrate formats

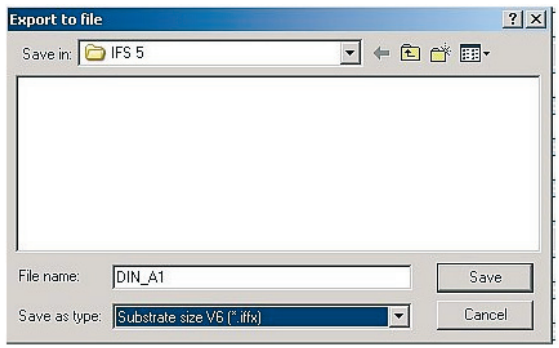
1. Click on **Substrate sizes** in the **Database** menu. The list of substrate formats is displayed on the left of the **Database: Substrate sizes** window.
2. Click on the substrate format you want to delete.
3. Click on **Delete.** The **Confirm delete** window is displayed.
4. Click on **OK**. The substrate format is deleted.

18.6 Send substrate formats

In the **Database: substrate formats** you can select one or more substrate formats and send them by email by clicking on **Send.** Please note Section 3.6.4 “Email”.

18.7 Exporting substrate formats

1. Click on **Substrate sizes** in the **Database** menu.
2. Click on the substrate format you want to export in the **Database: Substrate sizes** window.



If you want to export several substrate formats together, hold the CTRL key down and then click on the substrate formats to be exported. When exported, they will be written to the same file.

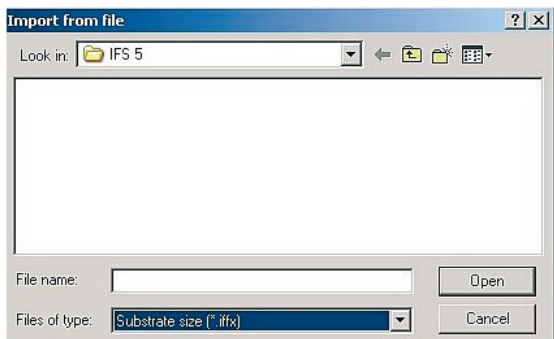
3. Click on **Export**. The **Export to file** window appears.

In the **Filename** field, there will be a suggested designation, consisting of the first characters of the substrate format designation and the file type **.iffx**.

4. Select the drive and the directory to which the file will be written.
5. Click on **OK**. The data will be converted into ASCII format and written to the relevant file.

18.8 Importing substrate formats

1. Click on **Substrate sizes** in the **Database** menu.
2. Click on **Import**. The **Import from file** window appears.



3. Select the drive and the directory from which you want to import the file.

The directory selected will display all ***.iffx** files.

4. Select the file to be imported.
5. Click on **OK**. The **Confirm import** window appears.
6. Confirm the import by clicking on **OK**. The name of the imported substrate format appears in the list in the **Database: substrate formats** window.

19 Processing and creating basic materials

(basic materials module only)

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19

Processing and creating basic materials

(basic materials module only)

19.1 General

The basic materials module must be activated to permit basic materials to be processed and newly prepared (see Section 3.7 “Program versions and auxiliary modules”).

The inks and the solvent of the assortment can be split into their basic materials. For this purpose a database of all basic materials available must first be compiled. The database of basic materials can contain designation, additional description, price and type (pigment/concentrate, binder/varnish, additive and solvent) of the basic material. Basic materials of pigment/concentrate type are considered colorants. The remaining types of basic materials are considered clear. The type description is used for sorting in the recipes.

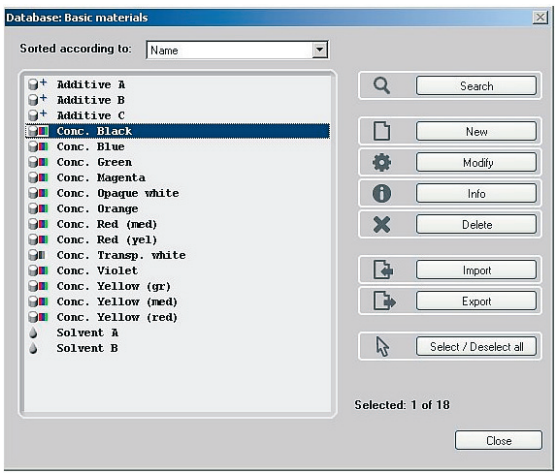
Following entry of the basic materials in the database, their percentage proportions (percent by weight) in the various inks (basic inks in viscosity module) of the assortment must be entered (see Section 14.4.8 “Division of assortment inks into basic materials”). It is possible to assign more than one pigment/concentrate to one ink, although the clarity “one ink <-> one pigment/concentrate” is then lost.

Three different types of recipe display therefore now exist:

1. Print ready inks recipe (solvent, if present, contained in every individual ink)
2. Recipe for basic inks and solvent (viscosity module only)
3. Basic materials recipe

Inputs of new recipes (command **Recipe > New**) or modifications to existing recipes (command **Recipe > Modify**) can be made in all three types of display. For the input of pigments/concentrates in the basic materials display, the non-colorant components (binder-varnish, additives and solvents) are added automatically in proportion, in order to obtain the physical properties (e.g. viscosity, ...) of the ink. This mechanism can be removed (e.g. for the clear basic materials), so that non-proportional quantity changes can also be made. You cannot continue to calculate with non-proportional modified recipes however. In particular, the possibility for recipe correction is lost. One solution is to make a copy of the still calculable recipe, to make the required changes to this and then to save it under another name. A copy can be made by saving the same recipe twice under different designations.

19.2 Opening database basic materials



1. Click on **Basic materials** in the **Database** menu. The **Database: Basic materials** window appears.

The title line shows the name of the current database. If you want to change the database, please note Section 21.3 “Selecting a database”.

On the left of the window is an alphabetically ordered list of all stored basic materials. You can also sort them by date of saving. Simply click on the **Sorted according to** field and select the **Date/Time** option.

19.3 Processing an existing basic material

1. On the left of the **Database: Basic materials** window, click first on the basic material you want to process and then on **Modify**. The **Basic Material Entry** window appears.

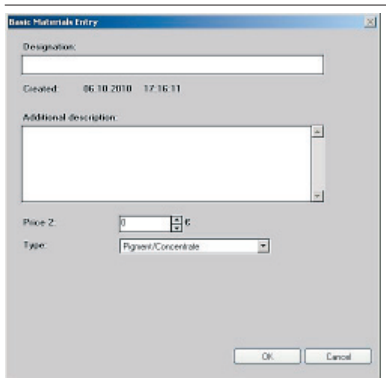
The designation and additional description, as well as price and type of basic material, can be altered or supplemented here. The procedure is the same as for the definition of a new basic material (see Section 19.4 “Defining a new basic material”).

2. Make the desired entries and then click on **OK**.

19.4 Defining a new basic material

A designation and the type of the basic material must be entered in the **Basic Materials Entry** window. Input of the price and an additional description is optional. The following types of basic material can be assigned:

- pigment/concentrate
- binder/varnish
- additive
- solvent



1. Click on **New** in the **Database: Basic materials** window. The **Basic Materials Entry** window appears.
2. Make the desired entries in the **Designation**, **Additional description**, **Price** and **Type** fields.

19.5 Deleting basic materials

1. Click on **Basic materials** in the **Database** menu. The **Database: Basic materials** window will be displayed.
2. Click on the basic material to be deleted.
3. Click on **Delete**. The **Confirm deleting** window will be displayed.
4. Click on **OK**. The basic material is deleted.

19.6 Exporting basic materials

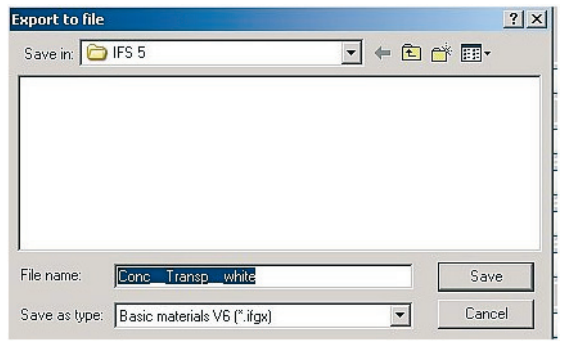
1. Click on **Basic materials** in the **Database** menu.
2. Click on the basic material you want to export in the **Database: Basic materials** window.

If you want to export several basic materials together, hold the CTRL key down and then click on the basic materials to be exported. When exported, they will be written to the same file.

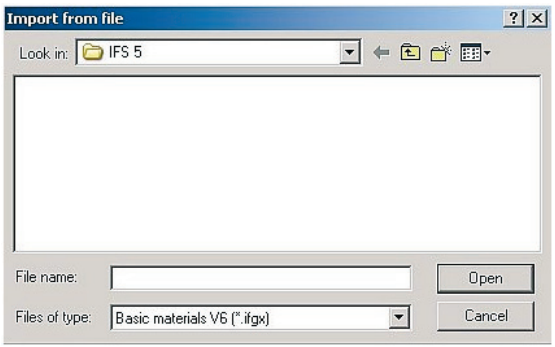
3. Click on **Export**. The **Export to file** window appears.

In the **Filename** field, there will be a suggested designation, consisting of the first characters of the basic material designation and the suffix **.ifgx**, if you have selected a single substrate, or ***.ifgx**, if you have selected several basic materials. In the latter case, you must enter a designation instead of the *.

4. Select the drive and the directory to which the file will be written.
5. Click on **OK**. The data will be converted into ASCII format and written to the relevant file.



19.7 Importing basic materials



1. Click on **Basic materials** in the **Database** menu.
2. Click on **Import**. The **Import from file** window appears.
3. Select the drive and the directory from which you want to import the file.

The directory selected will display all ***.ifgx** files.

4. Select the file to be imported.
5. Click on **OK**. The **Confirm import** window appears.
6. Confirm the import by clicking on **OK**. The name of the imported basic material appears in the list in the **Database: basic materials** window.

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20 Processing and creating film thickness objects

20.1 General

In the film thickness objects database you can enter the film thicknesses/ weights per area/ink quantities of screens (screen printing) and rollers (flexo/gravure printing). If when you were defining an assortment (see Section 14.4.2 “Preparing an assortment”) you entered the calibration screen or calibration roller, a different screen or roller can be used for the formulation (see Section 23.2 “Formulation settings”). InkFormulation adapts the recipe to the screen or roller being used in each case. Make sure you use the same unit of measurement when entering the film thickness information for the different screens or rollers.

You can generally obtain film thickness data from the manufacturer of the screens or rollers.

When creating a new thickness object the user can either enter an absolute value for the thickness or based on an assortment to be calculated by the InkFormulation.

a) Absolute

The absolute value is entered manually. The value is shown in the database and during the formulation.

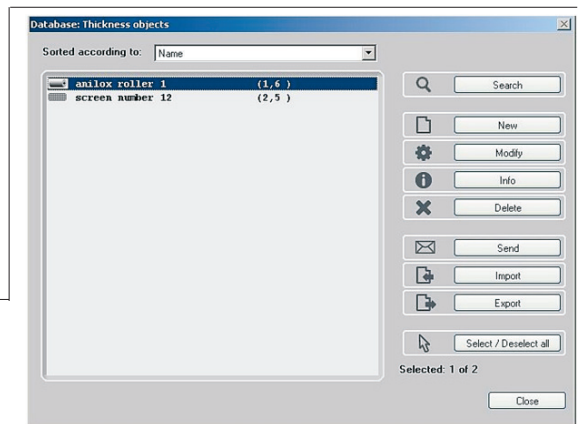
b) Relative

The relative value is calculated by the software. That value based on one assortment. Using different assortments it is not possible to show an absolute value but the relative value to the current assortment.

The selection fields for the film thickness objects in the **Set up assortment** (see Section 14.4.2 “Preparing an assortment”) and **Formulation settings** (see Section 23.2 “Formulation settings”) windows are only displayed if corresponding film thickness objects are defined in the film thickness objects database.

20.2 Opening the film thickness objects database

1. Click on the **Database** menu on **thickness objects.**
   The **Database: Thickness objects** window appears.



The title line shows the name of the current database. If you want to change the database, please note Section 21.3 “Selecting a database”.

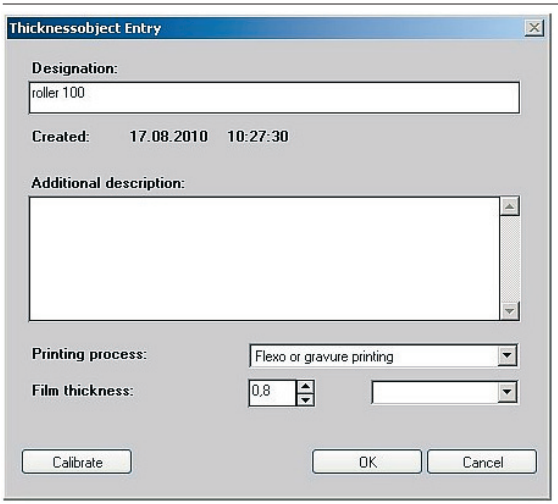
In the left-hand part of the window you will find an alphabetical list of all saved ink film thickness objects with defined absolute values or "calibrated". If the object is already calibrated, the relative value is defined for an assortment. You can also sort this by date saved, if you click on the **Sort by** field and select the **Date/time** option.

20.3 Processing existing film thickness objects

1. Click in the left-hand part of the **Database: film thickness objects** window on the film thickness object which you want to process and then on **Modify.** The **Thicknessobject Entry** window appears.

Here you can alter or add to the designation, additional description, printing process and film thickness/weight per area/ink quantity of the film thickness object. Proceed exactly as when defining a new film thickness object (see Section 20.4 "Defining new film thickness objects").

2. Make the required changes and then click on **OK**.
3. Click on **Calculate** to use the automatically thickness calibration of InkFormulation. Refer to Section 25.5 **Application Notes** to find a description on the use.



20.4 Defining new film thickness objects

1. Click on **New** in the **Database: thickness objects** window. The **Thicknessobject Entry** window appears.
2. Make the entries for designation, printing process, film thickness/ weight per area/ink quantity of the screen or roller.

Make sure that you use the same unit of measurement for the film thickness data for the different screens or rollers. See application notes 25.5 "Thickness Calibration" for calibrating the ink film thickness.

20.5 Deleting film thickness objects

1. Click in the **Database** menu on **Film thickness objects.** In the **Film thickness objects** window on the left-hand side the list of film thickness objects is displayed.
2. Click on the film thickness object which you want to delete.
3. Click on **Delete.** The **Confirm delete** window appears.
4. Click on **OK**.

20.6 Sending film thickness objects

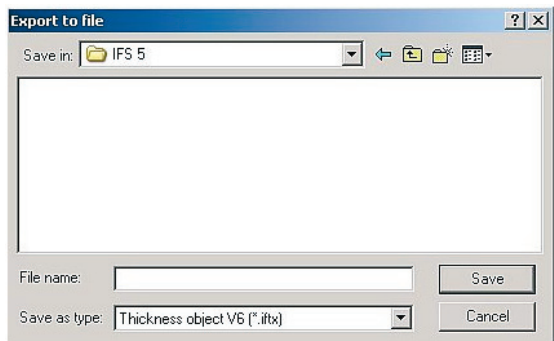
In the **Database: Film thickness objects** window you can select one or more film thickness objects and send them by email by then clicking on **Send**. Please note Section 3.6.4 “Email”.

20.7 Exporting film thickness objects

1. Click in the **Database** menu on **Film thickness objects.**
2. Click in the **Database: Thickness object entry** window on the film thickness object which you want to export.

If you want to export several film thickness objects together, keep the CTRL key pressed down and then click on the film thickness objects to be exported. These are written to the same file when exported.

3. Click on **Export**. The **Export to file** window appears.



In the **File name** field a designation is suggested, consisting of the film thickness object designation and the tag **.iftx**, if you have selected a single film thickness object or ***.iftx**, if you have selected several film thickness objects. In this case you must enter a designation instead of the *****.

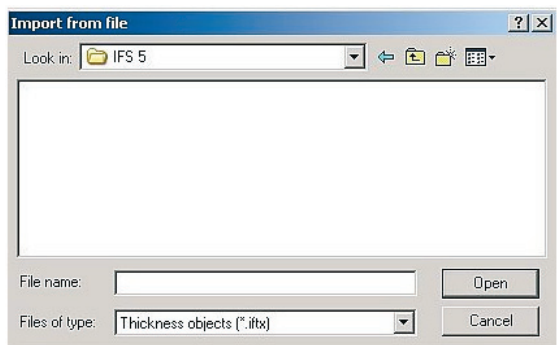
4. Select the drive and the directory to which the file should be written.
5. Click on **OK**. The data is converted to ASCII format and written to the appropriate file.

20.8 Importing film thickness objects

1. Click in the **Database** menu on **Film thickness objects**.
2. Click on **Import**. The **Import file** window appears.
3. Select the drive and the directory to which you want to import the file.

All ***.iftx** files are displayed in the selected directory.

4. Select the required file.
5. Click on **OK**. The **Confirm import** window appears.
6. Confirm the import by clicking on **OK**. The name of the film thickness object to be imported appears in the list in the **Database: film thickness objects** window.



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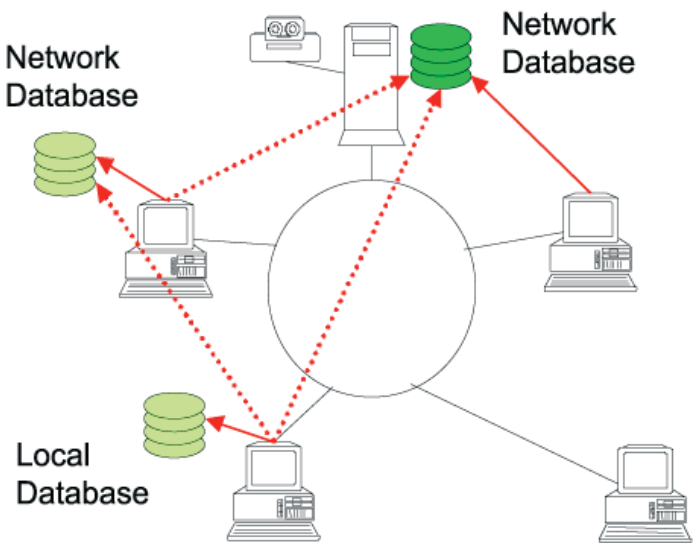
21 Setting up and managing databases

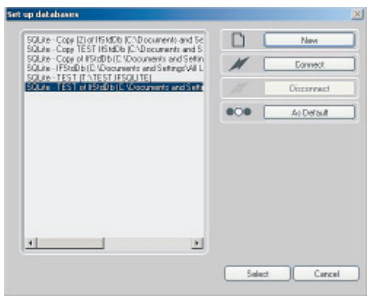
21.1 General

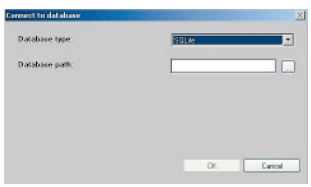
InkFormulation can be connected to more than one active database. A database can be opened at the same time by several InkFormulations, running on the same or different computers. Simultaneous access to the same database object is prevented by InkFormulation.

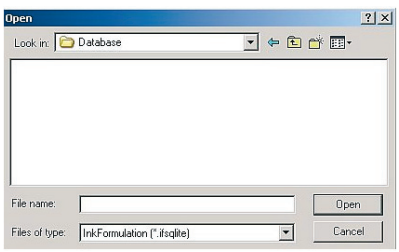
In a network, a shared database can be set up on any network computer. However, it is advantageous for data security if the shared database is stored on a file server.



When InkFormulation is installed, a database called **Default** is created automatically. Other databases can be created (see Section 21.2 “Setting up a new database”).







It is recommended that a separate database is created for each printing procedure. That makes database management easier and reduces the risk of confusion.

In each database the subdirectories **Assortments**, **BasicMaterials**, **Recipes**, **Applications**, **Substrates**, **SubstrateSizes** and **ThicknessObjects** are created.

In order to structure the recipe file in a manageable way even where there is a large number of recipes, further subdirectories can be created in the **Recipes** directory.

During installation a "Default" directory is created. The program saves the recipes in this directory unless you create a new one.

All other objects (assortments, substrates etc.) can only be structured by creating a new database.

21.2 Setting up a new database

1. Click on **Organize** in the **Database** menu. The **Organize Database** window is displayed.
2. Click on **New database** in the **Organize database** window.
3. In the **Create new database** window, enter the path for the database and click on OK. The database name you entered will be displayed in the **Set up database** window.

If you click on the ... button, you can use an Explorer window to select the folder where the database should be set up and to enter a name for the database.

21.3 Selecting a database

If more than one database is connected to InkFormulation, you must first select the one with which you want to work.

1. Click on **Organize** in the **Database** menu. The **Organize database** window is displayed.
2. Click on the required database in the list and then on **Select.**

All data will now be loaded from the selected database and stored in it.

21.4 Connecting an existing database

In order to have access to an existing database, it must be connected to InkFormulation.

1. Click on **Organize** in the **Database** menu. The **Organize database** window is displayed.
2. Click on **Connect database** in the **Organize database** window.
3. Enter the path of the database in the **Connect with database** window.

If you click on ... in the **Connect with database** window, you can select the required directory in a further window.

4. Click on **OK**, so that the name of the database is displayed in the **Organize database** window.

21.5 Disconnecting a database

When a database is no longer needed, it can be closed down. The database is then not deleted, but can be used again at any time by **Connect database.**

1. Click on **Organize** in the **Database** menu. The **Organize database** window is displayed.
2. Click on the database to be disconnected.
3. Click on **Disconnect database**. The name is then deleted from the database.

In order to delete the database completely, the database files must be deleted from Explorer. Of course this can only occur after all work stations are disconnected from this database.

21.6 Setting up a shared database in a network

To create a database on a network, proceed as follows:

- Create a new database in the **Organize database** window using the command **New database** (see Section 21.2 “Setting up a new database”).
- Enter a network path as the path for the database. It is irrelevant whether a drive is connected to the corresponding network drive or not.
- Enter a name for the new database and press **OK**.

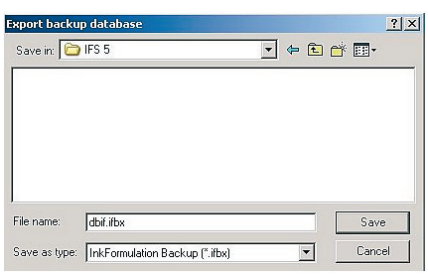
In order to access the network database from another computer, connect the database in **Organize database** using the **Connect database** command (see Section 21.4 “Connecting an existing database”). For the database path enter the same path as when the database was generated.

21.7 Backing up the database

It is worthwhile regularly backing up the database on a CD/DVD or other standard storage medium. Keep the backup CD/DVD in a safe place. In this way if there is a fault on the hard disk or any data loss for other reasons, irreplaceable data can be reloaded.

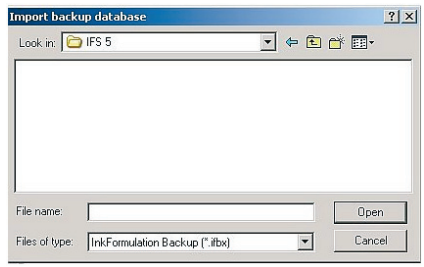
If the database is larger than the storage capacity of a CD/DVD, export the database on to the hard disk and carry out the backup from there using a standard backup program. If you are working in a network, save your data on the server. Backup will then be carried out according to your server backup system.

1. If you have opened a recipe, save it.
2. Click on **Database** in the **File** menu and on **Backup** in the selection field. The **Export backup database** window appears.
3. In the field **File name** enter the name under which the database should be exported.
4. Select the drive and the directory to which the backup file should be exported.
5. Click on **Save.** The information window **Export backup database** appears and the backup file is exported.



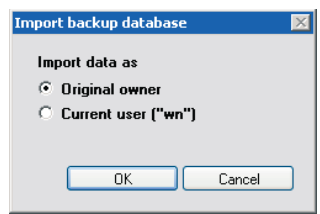
21.8 Restoring a database

1. If you have opened a recipe, close it.
2. Click on **Database** in the **File** menu and on **Restore** in the selection field. The **Import backup database** window appears.
3. Select the drive and directory from which you want to import the database.
4. Select the backup file. It now appears in the **File name** field.
5. Click on **Open.** The dialog window **Import backup database** appears.
6. Select the required option and click on OK.



Original Owner: In User administration, the same user rights are assigned as the original user had.

Current user: In User administration, the same user rights are assigned as the current user has. This option is preferable if, for example, an external database is to be imported.



7. The information window Restore database appears. Select the required option.

If you want to combine several databases into one, click on **Add to DB**. If you want to create a new database click on **Overwrite DB**.

Then the information window **Import backup database** appears and the database is added to or overwritten.

22 Printing

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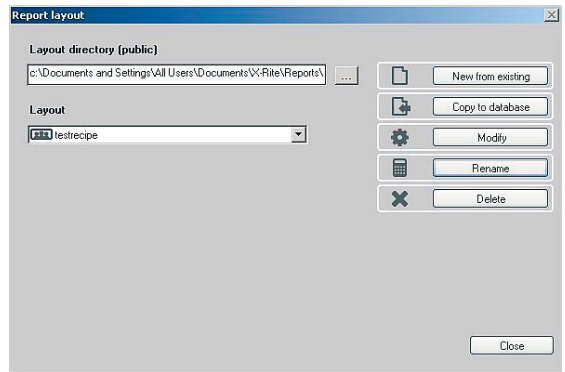
22 Printing

22.1 Layout

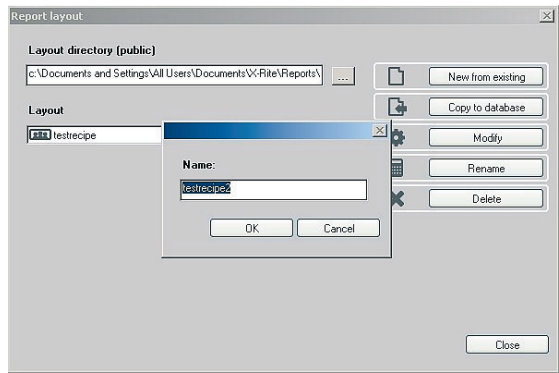
In the settings menu, click on **Set up printer.** In the **Report layout** window a list of all available layouts appears in the Layout list. The Recipe layout is the default X-Rite layout with all information for a recipe. The Recipe layout cannot be delete.

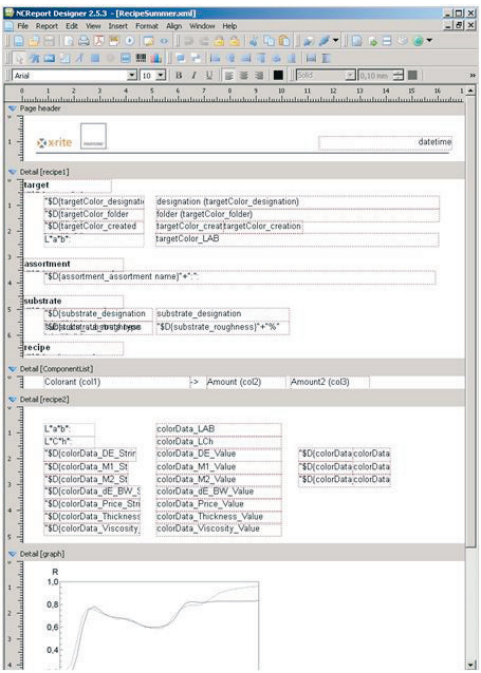


On the right side of the window you have the following functions:

New from existing: Create a new layout based on an existing layout.
Copy to database: Single layouts can be copied to the database. These are stored for the current user only and are not accessible to others.
Modify: Modify an existing layout.
Rename: Rename an existing layout
Delete: Delete an existing layout.

1. Highlight the layout **Recipe** and click on **New from existing**.
2. Enter a new designation and click **OK**.





The additional program NC Report Designer is opened and the layout Recipe is displayed.

The layout is split into sections outlining different details:

1) Recipe1

2) Component List

3) Recipe2

4) Graph

5) Additional Data

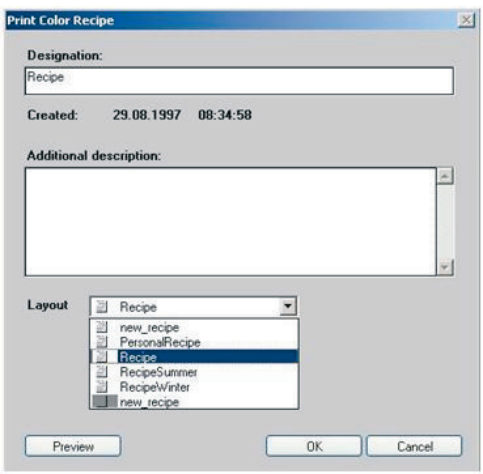
6) Page Footer

All details can be modified. Data items can be moved via drag & drop as long as they stay in the same sections. You cannot move date across sections.

- Font, size and color can all be modified
- Specific information can be deleted

Note: The borders as outlined (by InkFormulation) should NOT be altered.

For further information about the print layout editor see Section 25.6 Application Notes: Print layout editor.



22.1.1 Printing a recipe from the main window

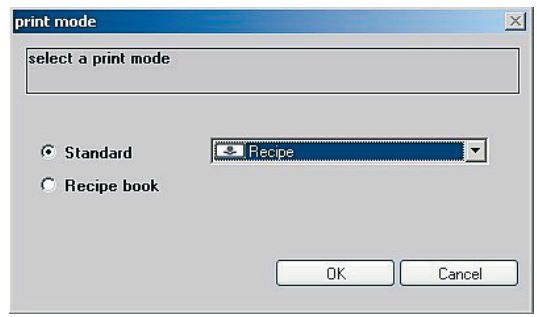
1. Click on the **Recipe print** symbol or on **Print** in the Recipe menu. The Print Color Recipe window appears.
2. Change or add to the designation, or additional description if you wish to do so.
3. Select the desired print layout. To check the layout, click on **Preview.**
4. Click **OK**. The current recipe is printed.

22.1.2 Printing a recipe from the database

1. Click on the **Recipe** in the Database menu.
2. From the recipe list, select one or more recipes you wish to print.
3. Select the print mode.

   Standard: Select this option to select an available print layout.

   Recipe book: Select this option to print the recipe designation, included components, and the amount are listed on.



4. Click OK. The selected recipes are printed.

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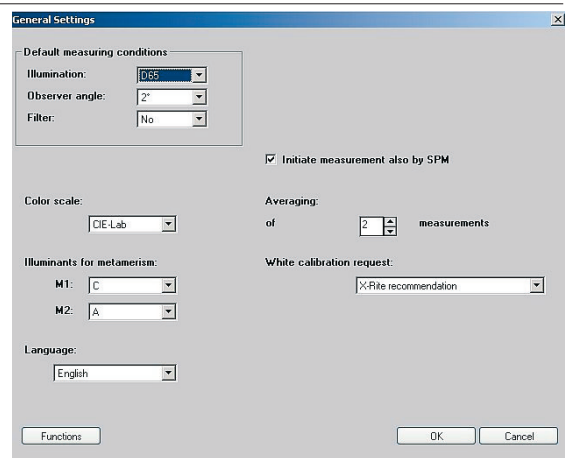
23 Making settings

23.1 General settings

General settings

Procedure:

1. In the **Settings** menu, click on **General**.
2. Select the desired options or make the desired entries (see following sections).
3. Click on **OK** once you have entered all your settings.



23.1.1 Default measuring conditions

You are free to define the default measuring conditions for the measurement of colorant calibrations, substrates and target colors (see Chapter 25 “Application notes”). You have various options for the parameters:

- Illumination
- Observer angle
- Physical measuring conditions (e.g. filter)

Please ensure that these values have been correctly set before you begin measuring. The physical measuring conditions of the spectrophotometer is permanently assigned to a measurement and cannot be modified later. In addition, the recipes are optimized in relation to illuminant and observer angle.

23.1.2 Color scale

You can choose between various color systems, such as CIE-Lab and CIE-LCh. Depending on the option selected, LCh values for example appear at various points in the program instead of Lab values.

23.1.3 Illuminants for metamerism

In the **M1** and **M2** fields, you can select two illuminants which are needed with recipes for reasons of metamerism.

- D65 Daylight (6500 Kelvin
- D50 Daylight (5000 Kelvin)
- A Electric bulb light
- F11 Strip light

After a recipe has been calculated, the main window will display the metamerism between the target color and the recipe color for the selected illuminants.

The illuminant under **M1** is also used to optimize recipes. Other things being equal, a change in the illuminant can lead to markedly different colorant proportions in the recipe if there is a large metamerism between the recipe and the target color.

23.1.4 White calibration request

If you select the **X-Rite recommendation** option, you will be requested by InkFormulation at various points in the program run to carry out a white calibration (see Section 4.2 “Performing a white calibration of the spectrophotometer”).
If you select the **never** option, then no requests will be made. In this case, it is up to you to ensure that the spectrophotometer is correctly calibrated.

23.1.5 Averaging

Depending on the homogeneity of your patterns, you can perform single measurements or multiple measurements with average value calculation. In the **Averaging** field, enter the number of measurements (a number between 1 and 10) that you wish to carry out for the measurement of a pattern.

If you have entered a number >1, then the **Averaging** window appears after each start of a measurement. The current measuring value and the current average value are displayed in the window. When the average value appears sufficiently stable to you, you can stop the measurement at any time. The accepted measuring value corresponds to the average of the performed measurements.

If you want a single measurement, enter **1**.

23.1.6 Language

If necessary, you can select another language. Since you cannot change languages while the program is running, you have to quit and restart before the newly selected language becomes active.

23.1.7 Measurement initiation (SpectroEye and Spectrolino only)

If the **Initiate measurement also by SPM** check box is activated, the measurement can be started either in InkFormulation or by the spectrophotometer. If deactivated, the measurement can be started in InkFormulation only.

23.1.8 Entering new functions

After a password has been entered, the functions of an additional module are activated (see Section 3.7 "Program versions and auxiliary modules").

1. Click on **Functions**. A dialog box displays the modules which have already been made available.
2. Click on **Password**. The **Password Entry** window appears.
3. In the **Password for the new functions** field, enter the password allocated to you by X-Rite and click on **OK**.

This releases the additional module which can now be used.

23.2 Formulation settings

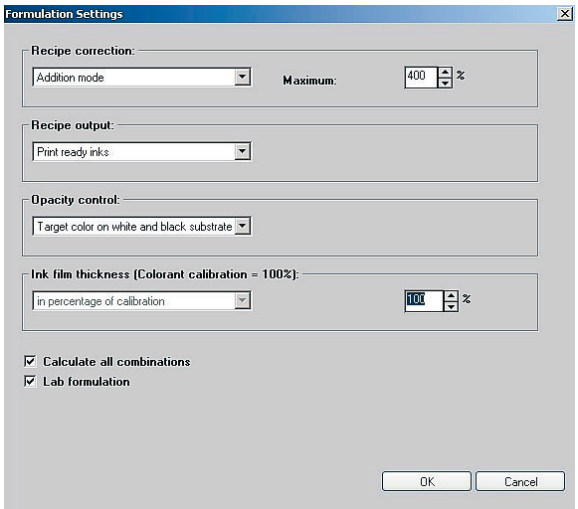
23.2.1 General

The settings which you can make for recipe calculation depend on the printing process of the assortment selected in the main window. Accordingly, you must first select the assortment which you want to use for formulation.

1. Click on **Formulation** in the **Settings** menu.

Entry fields will be displayed, depending on the printing process of the current assortment displayed in the main menu.

2. Select the desired options or make your entries (see following sections).
3. Click on **OK** once you have made all the settings.



This is how the screen appears if an assortment for flexo or gravure printing has been selected in the main window.

23.2.2 Recipe correction

You can choose between the **Basic recipe mode** and the **Addition mode**.

If the **Basic recipe mode** is selected, an improved basic recipe is displayed in the recipe output in the main window.

If the **Addition mode** is selected, the ink quantities for the basic recipe and the additional ink are displayed separately.

In the field **Maximal** you can determine the maximum additional ink quantity for recipe correction. In this case, 100% means that the additional ink quantity may not exceed the quantity of ink used to produce the basic recipe.

If the additional ink quantity is too restricted, the color distance for the correction recipe can no longer be reduced to 0.

23.2.3 Recipe output

With the recipe output it can be determined in which way a recipe should be displayed in the main window. In principle, three different types of display are possible:

- **Print ready inks**

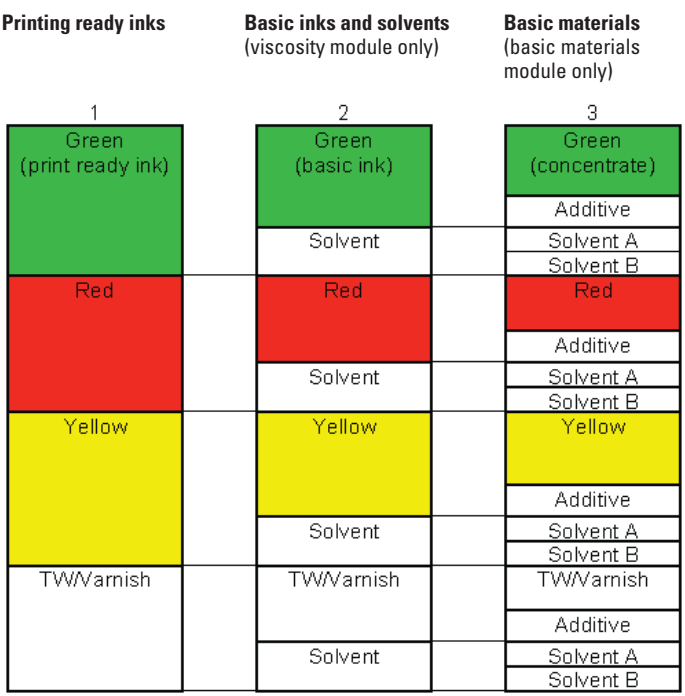
The inks of the assortment are shown in the way they were prepared for the colorant calibrations (i.e. without division into basic materials and with the viscosity used for the colorant calibrations).

- **Basic inks and solvents** (viscosity module only)

The solvent proportions of the inks in the assortment are calculated from the viscosity curves and displayed separately as a sum. The ink quantities in the recipe are basic inks quantities (i.e. without solvent additive).

- **Basic materials** (basic materials module only)

The inks of the assortment can be divided into any components (pigments/concentrates, binding agent/varnish, additives and solvents) with the aid of the basic materials database. The component proportions of the individual inks are displayed as a sum in the basic materials recipe. At the top are the colorant components such as pigments or concentrates, lower down the non-colorant components in the sequence binding agent/varnish, additives and solvents. With this setting the recipe is displayed in each case with the basic material price (P2). The recipe output can be changed to Print Ready **inks or Basic inks and solvents** (viscosity module only) at any time. With these settings the recipe is shown in each case with the print ready ink price (P1).

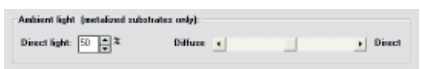


23.2.4 Opacity control (opacity module only)

The following settings are possible:

If an assortment that was measured using a spherical optic spectrophotometer (D8i) is loaded in the main window or if such an instrument is connected, then in the modes **None (just color match)**, **Transparent** and **Target color on white and black substrate**, an additional field **Ambient light (metalized substrates only)** is displayed. Please note the explanation at the end of the section.

- **none (just color match):** With this setting the InkFormulation 6 operates without taking account of the opacity.
- **transparent:** If the **transparent** setting is used for formulation, the least possible covering power (0%) is observed in addition to color optimizing.
- **opaque:** If the **opaque** setting is used for formulation, recipes are made with a covering power as high as possible (100%) in addition to color optimizing.
- **user defined:** With the setting **user defined** it is possible to give the covering power in percent:
  100 % > absolute coverage (dE[white/black] = 0)
  0 % > absolute transparency (dE[white/black] = dE[target color on white / absolute black]
- **Target color on white and black substrate:** This setting can be used in cases where the ink to be matched is given both on white and also on black substrate as target color. For the formulation a measurement of the target color on black substrate is then additionally called for.



Special case "Formulating for metalized substrates"

The adjustment option that is provided here by means of a slider control means that the formulation can be adapted to the ambient light conditions.

In order to be able to formulate colors on reflective metalized substrates, it is essential to use a spectrophotometer with a spherical optic (Diffus/8°). It is also essential in these cases to work using the D8i setting (equates to SCI, i.e. gloss components are included in the measurement).

It is only necessary to adjust the slider control when formulating using **transparent colors** on **metalized substrates**, because it is then that the nature of the ambient light has a very great effect on how the result of the formulation is perceived visually.

Normally ambient light consists of a mixture of diffuse and directed (direct) light. Depending on the proportions of diffuse and directed light, a recipe printed using transparent colors on a metalized substrate will be perceived as brighter or darker.

The higher the proportion of directed (direct) light, the darker the transparent color on the metalized substrate will appear.
The higher the proportion of diffuse (undirected) light, the brighter the transparent color on the metalized substrate will appear.

Since, in these circumstances, changing ambient light conditions can exert a very great influence on the way colors are perceived, it is recommended that color matching is carried out in an environment where the lighting remains constant and corresponds as closely as possible to the conditions in which the color will ultimately be seen.
By using the slider control, the brightness of the recipe can be adjusted so that it is perceived correctly by the eye in the given ambient light conditions.

The **50%** direct light slider control setting roughly equates to a mixture of directed and diffuse light such as that experienced when looking at a sample by the window at about midday without direct sunlight.
It is recommended that, whenever the slider control has been adjusted for best results, it is always returned to this starting position.

Example: Moving the slider control along to the right, e.g. to 60%, has the effect of making a **brighter** formulation for the recipe. It may be necessary to make such an adjustment if the sample has to be made to match the target color under artificial light (e.g. light bulbs, fluorescent strips), where there is a higher proportion of directed light.

The slider control is sensitive. A slight shift of the control (e.g. by 10%) will have a relatively large effect on the brightness of the recipe.

Summary of the effect when adjusting the slider control

Ambient light	Adjusting the slider control	Recipe	Explanation
High proportion of directed light	To the right (direct)	Formulated more brightly	The higher the proportion of directed ambient light, the darker the transparent color on the metalized substrate will appear. The recipe therefore has to be adjusted to make it **brighter**.
High proportion of diffuse light	To the left (diffuse)	Formulated more darkly	The higher the proportion of diffuse ambient light, the brighter the transparent color on the metalized substrate will appear. The recipe therefore has to be adjusted to make it **darker**.

Bright target colors which are formulated entirely transparently on a reflective metalized substrate and are intended to be viewed under an ambient light with a high proportion of directed light can sometimes not be reproduced satisfactorily. The reason for this is the inherent color of the metalized substrate, which appears as gray. Since with transparent colors the background is seen in its full effect, the recipe may appear too dark even if it is formulated very brightly.

In such a case, InkFormulation will indicate that the task is not possible by means of an increased visual dE. The only possibility that can be tried then is to reproduce the target color by adding opaque white to the recipe (e.g. by using the option **Control covering power** > **user-defined**). Because of the covering effect of the opaque white on the background, it is possible to formulate even bright colors on reflective metalized substrates, but the reflective effect of the substrate is lost on the areas that have been printed.

23.2.5 Ink film thickness

This field is used to enter the ink film thickness for which the recipes are to be calculated. By definition, an ink film thickness of 100% represents the medium thickness for colorant calibrations of the current assortment.

Offset printing

It is possible to enter a minimum and a maximum ink film thickness (weight per area). By increasing the maximum film thickness, you extend the color range which can be achieved with a particular assortment. Let us take, for example, the highly saturated red of a Marlboro packet, which can often be obtained only by increasing the maximum film thickness. By reducing the minimum film thickness, it is possible to reduce the transparent white, if the recipe contains any. It goes without saying that you should enter only film thicknesses which are technically feasible.

Flexo or gravure printing / Screen printing

The ink film thickness depends on the size of the mesh (screen printing), on the cell count of the anilox roll (flexo printing) or the depth or volume of the engraved roll (gravure printing), which is determined by the type of the engraving or the etching.

As a percentage of the colorant calibration: In the event of deviations in relation to the colorant calibration conditions of the current assortment, it is possible to enter here a rough estimate of the actual film thickness. Under more or less the same conditions, you can leave the setting on 100%.

Film thickness object: If a film thickness object has been assigned to the current assortment and film thickness objects have been defined for the formulation, you can select a film thickness object. InkFormulation automatically calculates the conversion factor and adjusts the recipe accordingly.

23.2.6 Calculate all combinations

When this command box is activated, all possible combinations of the selected colors are calculated during formulation.
If the assortment includes very many colors but you still want to include them all in the recipe calculation, you can deactivate the command box. The number of calculated recipes is then drastically reduced by an intelligent algorithm. However, the omission of a feasible recipe cannot be excluded.

23.2.7 Lab formulation

When this check box is activated, during the process of formulating a basic recipe, the Lab entry button is displayed in the **Basic recipe** window, and this can be used to define this target color as a lab value.

23.3 Spectrophotometer settings

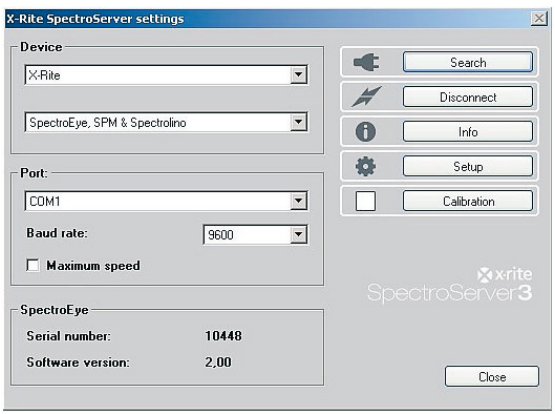
The type of spectrophotometer can be entered here and connection of InkFormulation made to the measuring unit. In addition, settings specific to the unit (e.g. gloss trap, UV-filter, etc.) can be performed by means of the **Setup** button.
By clicking on the command button **Calibration** a white calibration is triggered.

The following spectrophotometer data are displayed:

- Manufacturer
- Device type
- Port
- Baud rate
- Serial number
- Software version

(SpectroEye and Spectrolino unit types only): InkFormulation is capable of recognizing the interface selected without external assistance. You should use this selection facility only if you connect the SPM spectrophotometer after InkFormulation has already started or another type of spectrophotometer was previously connected.

If you click on the **Maximum speed** check box, your spectrophotometer is set to a 57600 baud transfer rate. Do not select this option if your spectrophotometer is being used with a printer or other device having a lower transfer rate. Please refer to the operating instructions for the spectrophotometer.



1. In the main window, click on the **SPM** symbol or in the **Settings** menu on **SPM**. The **X-Rite SpectroServer settings** window appears.
2. Make the required entries in the **Device** and **Interface** selection fields.

If the interface is not known, click on **Automatic search** in the selection field. The interface is found and displayed in the **Port** field. If the interface is already correctly selected, you can click directly on the **Search** button.

3. If specific settings are necessary for the unit, click on **Setup**. Make the required inputs in the window displayed and then click on **OK**.

The **Setup** button is not active for the SpectroEye and Spectrolino.

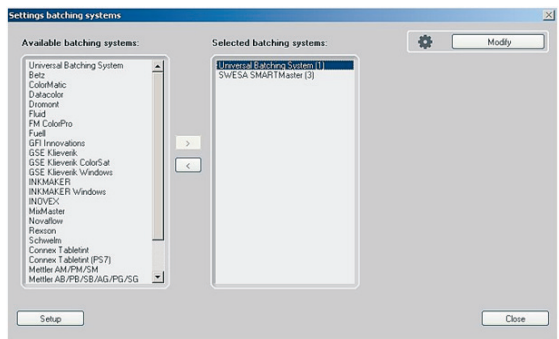
4. Click on **Close** when all inputs have been made.

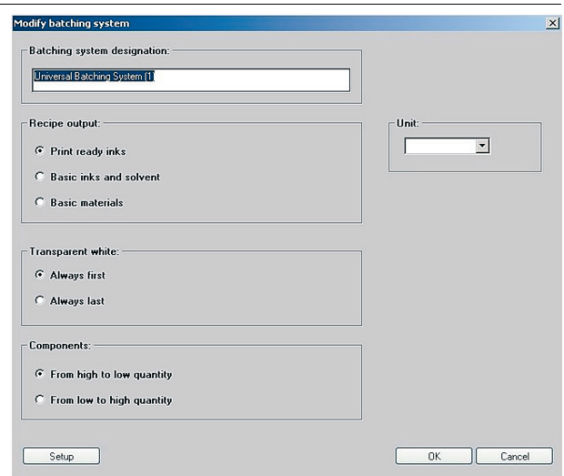
23.4 Batching systems settings

(module weighing and batching systems only)

Various weighing and batching systems can be connected to InkFormulation. The **Settings batching systems** window provides the possibility for setting the recipe to be sent to the batching system individually for every batching system connected. The specific parameters for the batching system are set for data exchange with the **Setup** button. Please pay close attention to the manufacturer's instructions.

1. Click in the **Settings** menu on **Batching systems**.
   The **Settings batching systems** window appears.
2. In the **Available batching systems** field, click on the one you want to use for formulation .
3. Click on the pushbutton with the arrow showing to the right.
   The **Modify batching system** window appears.
4. If required, alter the designation and the options for **Recipe output**, **Transparent white** and **Components**.



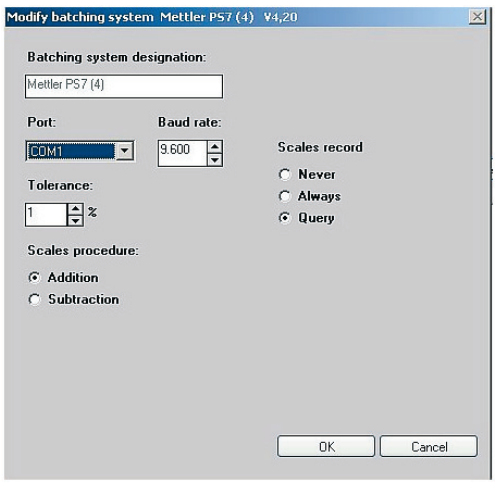


Recipe output: Selection between **Print ready inks**, **Basic inks and solvent** (viscosity module only) and Basic materials (basic materials module only). If solvent is included, the user can reduce its amount in the recipe, as long as "Basic inks and solvent" or "Basic materials" is selected.

Transparent white: Selection of position at which the transparent white (extender) is to be set in the recipe (first or last).

Components: Selection of sequence in which the individual recipe components are to be weighed in. Components with large volumes first or last.

Unit: Entering the target unit for the batching system. If Unit conversion is activated (see Section 23.8 "Unit settings"), then the recipe quantities are sent to the batching system expressed in that unit.



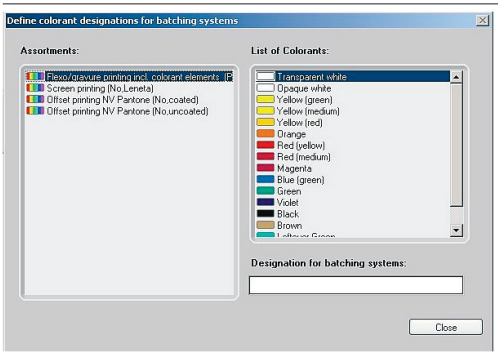
Setup: If you click on **Setup**, the **Modify batching system** window is displayed.
Specific data can be entered here for the weighing or batching system (e.g. interface, output file, etc.). Pay careful attention to the operating instructions from the relevant manufacturer.

5. Click on **OK** when all inputs have been made. The designation of the batching system is then displayed in the **Selected batching systems** field.

Define colorant designations for batching systems
If a batching system uses different colorant designations from the assortment, you can enter these in the **Define colorant designations for batching systems** window .

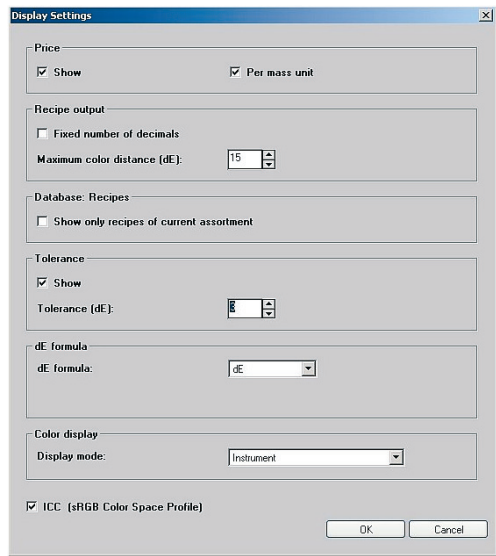
Procedure:

1. In the **Batching systems settings** window, click on **Setup**. The **Define colorant designations for batching systems** window comes up.
2. On the left-hand side of the window, select an assortment. The colors in the assortment are displayed on the right-hand side of the window.
3. Select a color and enter the corresponding designation in the **Designation for batching systems** field .
4. When you have entered all the color designations, click on **Close**.



23.5 Display settings

Here you can select different settings for the recipe output:



- Type of price information
- Number of decimal places for the display of ink quantities in the recipes.
- Maximal color distance dE of the recipes which should be displayed in the recipe selection.
- Tolerance:
  When this check box is activated, the recipes which are within the selected tolerance are marked with **PASS**. Recipes falling outside the tolerance are marked with **FAIL** (displayed in the main window next to the colorant designation).
- dE Formula:

  Various dE formulas can be selected.
- Color display:

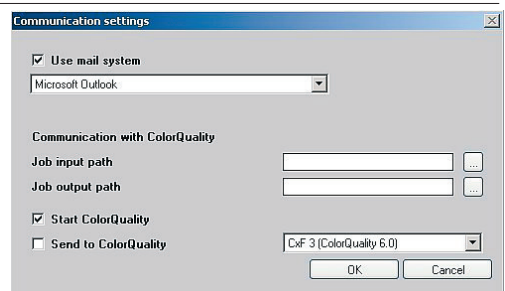
  In the main window, alongside the color fields for “target color“ and “recipe“, the color values and color deviation are displayed for whichever display mode is selected, “Instrument“ or “Visual“. The symbol for the selected display mode is boxed in. By clicking on the symbols in the color fields, the display mode can be changed at any time. However, it is recommended that you formulate colors in “Visual“ mode.
- ICC:
  When this check box is activated, the colors are converted for display using the standard color profile of the display device.

23.6 Communication settings

In this window, the mail system which is to be used can be selected. At present, Microsoft Outlook, Lotus Notes 4.x and Lotus Notes R5 are available.

When the check box **Use mail system** is activated, then the **Send** button is displayed in certain windows.

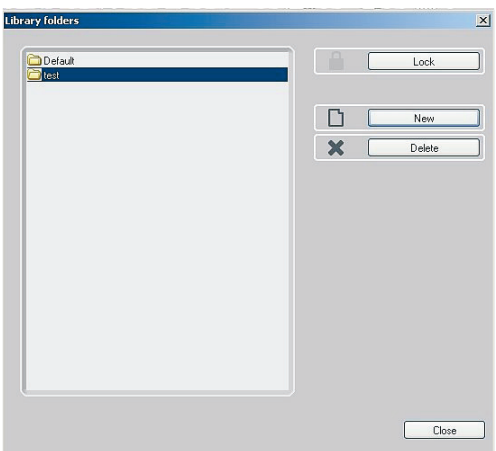
It is also possible here to define a shared memory area for data exchange between InkFormulation and ColorQuality.



23.7 Library folders

Recipe folders can be write-protected. Users can thereby be prevented from unintentionally storing recipes into a protected folder.

Write-protected folders may be desired in cases where collections of prepared recipes are made available to users in order to serve as a basis for new recipes, for example as a basis for palette formulations.



Procedure:

New or existing recipe folders can be set with write-protection.

1. In the **Settings** menu click on **Library folders.**
2. Highlighted the desired folder and then click the **Lock** button.

   The designation of the button changes to **Unlock** and the folder is marked by a red key symbol.

   Clicking the button again with the folder highlight will cause it to unlock.

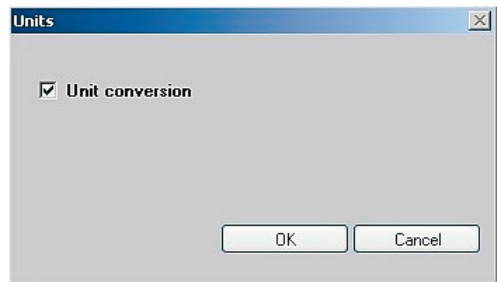
Rights aspects: If the User Administration is in use, then the rights behave identically to those in the **User Administration.** A member of a lower data access group cannot unlock a folder locked by a member of a higher data access group.

Note: Loading recipes from write protected folders is always possible. Write protected folders are not displayed upon saving recipes.

23.8 Unit settings

When the **Unit conversion** check box is activated, two additional fields are displayed in the lower section of the main window. The recipe quantities are converted directly from the source unit to the target unit.

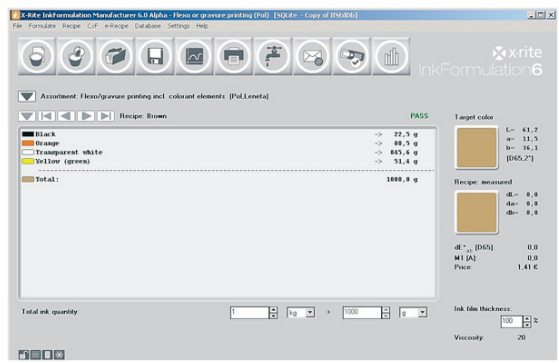
(Weighing and batching systems module only): If Unit conversion is activated, the target unit can also be set in the setup procedure for the batching system (see Section 23.4 “Batching systems settings (module weighing and batching systems only)”). The recipe quantities are then sent to the batching system expressed in that unit.



23.9 Set up printer

In the **Settings** menu, click on **Set up Printer**. The Set up printer widow appears.

For further information, see Section 22 Printing.



23.10 Workflow settings

In the Settings menu, click on **Workflow**.

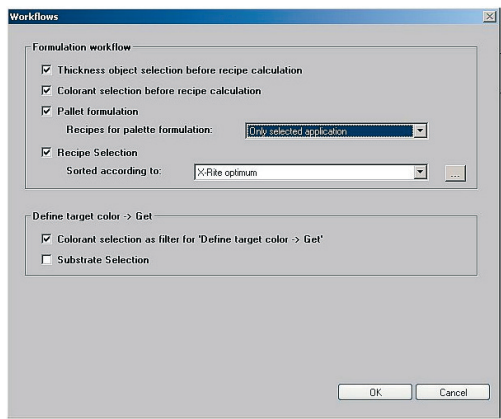
You can deactivate the following steps for different workflows:

Formulation workflow

- Thickness object
- Colorant selection
- Palette formulation
- Recipe selection

Define target color > Get

- Colorant selection
- Substrate selection



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24 Quitting Ink Formulation

24.1 Quitting Ink Formulation

Save the current recipe before quitting InkFormulation (see Section 5.11 “Saving a recipe”).

Never switch your computer off before exiting the program in the prescribed manner. Otherwise, data may be lost.

1. In the **File** menu, click on **Quit**.

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25 Application notes

25.1 Recommended instrument settings

Generally the Pol filter leads to good formulating results on a variety of different substrates (glossy, matt, absorbent, non-absorbent), because surface effects such as bronzing, the wet/dry problem and the effect of optical brighteners on measurement are greatly reduced.

If the target color and the reproduced color have different surface structures, or if covering power has to be taken into account when formulating with scattering pigments (e.g. opaque white), then the Pol filter can produce unsatisfactory results.

To support a consistent workflow, (incl. creative and color management sectors), the No filter should be used, because all the measuring instruments in the workflow are equipped with No filters.

The D65 filter should not be used during formulation, because it can lead to incorrect results on substrates with optical brighteners. It should only be used if the aim is to test the effect of optical brighteners in substrates.

The UV Cut filter can be used for formulation, if, contrary to all recommendations, assortments are applied to substrates with a high proportion of optical brighteners. In the preliminary printing stage, the UV Cut filter can be used when measuring test charts printed on substrates with a high proportion of optical brighteners. This can improve the subsequent calculation of ICC profiles.

Apart from the characteristics of the various filters listed above, the following aspects are very important and must be taken into account:
In InkFormulation each recipe is associated with a particular assortment and therefore also with the filter which was used when the assortment was entered. This shows the importance of using the correct filter right from the start.
It can therefore be advantageous to measure newly entered assortments with more than one filter setting. That increases the flexibility of the ink manufacturer to respond to his end customers' differing filter requirements, especially if they are already using other assortments. This also prevents problems with filter handling.

25.2 Measuring patterns

The pattern measurement should take place on the same homogeneous background (e.g. white cardboard) as that used for comparison between the pattern and the color reproduced.

Only unit types with small measuring field: When measuring coarsely structured patterns, multiple measurements must be carried out. By observing the average value continuously displayed on the screen, you can judge when enough measurements have been made. As a rule of thumb, you can quit when the Lab average displayed deviates by less than dE = 0.2.

25.3 Colorant calibration series

24.3.1 General

The colorants used for mixing a pattern have to be made known to the computer in the form of colorant calibrations. A colorant calibration consists of a certain number of proportionately different mixtures of a colorant with transparent white (varnish, binder, thinner, etc) on a substrate (print carrier). In a colorant calibration series, we combine a selection of calibrations of different colorants in which the same substrate, the same transparent white and the same manufacturing process were used. As a rule, one colorant calibration series is allocated to one assortment.
Colorant calibrations should correspond as closely as possible to normal printing conditions. For example, the ink film thickness used in the colorant calibrations should be in the same order of magnitude as that applying in ordinary printing. It is clear that colorant calibrations play a vital role. Incorrect or inaccurate calibrations usually result in unsatisfactory recipes. Reproducibility is also crucial. Unless the printing process remains constant, the recipe calculation is a waste of time.

25.3.2 Absorption and scattering of an ink

The physical characteristics of an ink are determined by absorption and scattering capacity. If an ink (pigment, dye) has only the property of absorption, the measuring values (remissions) of the concentration grades on white substrate are sufficient for calculation of the optical data.

An ink with no scattering (only absorption) is characterized by the fact that it is invisible if applied to a black substrate.

If an ink (pigment) possesses scattering capacity (e.g. opaque white), measured values of concentration grades on black substrate are required to calculate the optical data. It is then recommended to carry out colorant calibration on a contrast substrate.

25.3.3 Concentration grades on white and black substrates

For optimum determination of the optical data of an ink, we recommend preparing around six (a minimum of four) different concentration grades on white and black substrate. As the color differences are more pronounced in the lower concentration range (more transparent white, less ink), it makes sense to carry out a finer gradation in this area (e.g. a kind of geometrical progression).

The size of the intervals between the remission curves of individual concentration grades on the same substrate should be approximately similar. This is best achieved by doubling the concentrations.

We recommend the following concentration grades (all data relate to the percentage weights of the ink in a mixture of ink and transparent white):

Number of grades	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
6	2%	4%	8%	16%	32%	64%	–	–
7	2%	4%	8%	16%	32%	64%	100%	–
8	1%	2%	4%	8%	16%	32%	64%	100%

For concentrated colors the higher concentration grades give no additional information. In that case 1% and 2% grades for example are much more useful for calculating the optical data.

a. Inks with virtually no scattering (so-called transparent inks)
It is sufficient to produce all recommended grades on white substrate. This applies to most applications in **offset printing**.

For setting measuring mode **On white (transparent)** (see Section 14.4.2 “Preparing an assortment”).

b. Inks with scattering and absorption in the same order of magnitude (so-called translucent and opaque inks)

In this case, all recommended grades on white and on black substrate should be made available to the program. This applies to most applications in **flexo, gravure and screen printing**.

For setting measuring mode **On white and black (transparent)** (see Section 14.4.2 “Preparing an assortment”).

25.3.4 Substrate and transparent white

It is clear that the best recipes are obtained when the conditions for carrying out colorant calibrations match those for the mixing of a color pattern. This applies particularly to the substrate used and the transparent white. The optical data of the inks depend in greater or lesser degree on the absorptive capacity of the substrate and the characteristics of the transparent white used for the colorant calibrations.

We recommend that colorant calibrations should be carried out with a good quality substrate which has no optical brighteners and is representative of your most commonly used substrates.

The most suitable substrates for colorant calibrations are Leneta and Morest cardboards.

InkFormulation assigns a remission (measuring value of the X-Rite spectrophotometer) and a roughness value to every substrate (see Section 17.3 “Defining a new substrate”). In this way, it is possible to obtain satisfactory recipes for other substrates without having to prepare colorant calibrations for every substrate used. This applies particularly to substrates which differ from the substrate of the colorant calibration series only in color terms.

25.3.5 Ink film thickness

The colorant calibrations should be carried out with the film thickness which most commonly occurs in printing. It is essential to keep the film thickness as constant as possible throughout the colorant calibration series, as the program assumes this to be the case.

Offset printing: If the film thicknesses (weights per area) are gravimetrically controlled, the weights per area of the individual concentration grades and the average weight per area of the colorant calibration series can be entered. The program takes these entries into account in calculating the optical data.

Flexo or gravure printing / Screen printing: The ink film thickness depends on the size of the mesh (screen printing), on the cell count of the anilox roll (flexo printing) or the depth or volume of the engraved roll (gravure printing), which is determined by the type of the engraving resp. the etching. In other words, the constancy of the film thickness is more or less determined by the printing process.

25.3.6 Specific gravity

If the inks used in the colorant calibration series (including transparent white) are of more or less the same specific gravity, this input is not required. However, certain inks (e.g. opaque white) have a markedly higher specific gravity than other inks. In such cases, entry of the specific gravity (see Section 14.4.3 “Defining an assortment”) leads to better results.

25.3.7 Viscosity in flexo and gravure printing (viscosity module only)

It is an absolute prerequisite that all the inks in the colorant calibration series should be printed with the same viscosity. For this reason, it is recommended that all basic inks (not yet print ready) should first be adjusted to the same printing viscosity by adding a solvent and only then mixed with transparent white (varnish).

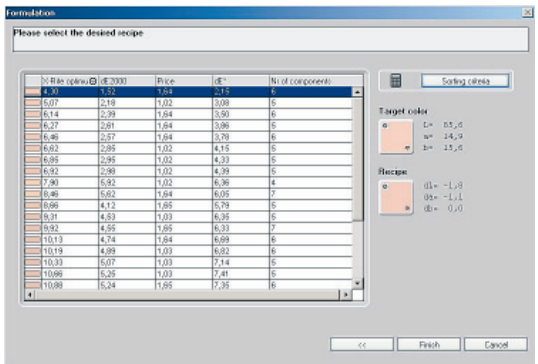
The transparent white must have the same printing viscosity as the inks.

When creating an assortment, it is essential to indicate to the program the printing viscosity (viscosity of the colorant calibrations) and, as a minimum, the percentages of solvent used to obtain the printing viscosity for the inks of the colorant calibration series (see Section 14.4.2 “Preparing an assortment”). To permit the calculation of recipes for other viscosities, it is necessary to enter the viscosity curves (see Section 14.4.7 “Entering a viscosity”).

25.3.8 Balance

If recipes are to be mixed with only small ink quantities (less than 100 g), it is necessary to use an electronic balance which is accurate to within at least 1/10 of a gramme.

25.4 Sorting Criterion Editor



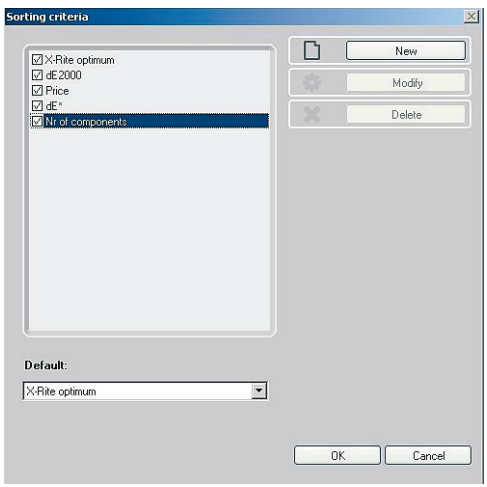
In the window “recipe selection” you can view a list of recipes sorted according to the desired sorting criterion. The user can choose from 5 pre-defined sorting criteria. Select one of the criterion and the recipes are automatically reordered, with the lowest value first, indicating the best recipe regarding this criterion.

Enabling a sorting criterion option

1. Click on **Sorting criteria**.
2. Select (x) criterion option and click on **OK**. The new criterion is displayed in the list.

Disabling a sorting criterion option

1. Click on **Sorting criteria**.
2. Unselect (no x) the desired criterion option and click on **OK**. The deactivated criterion is no longer displayed in the list.



25.4.1 Sorting criterion editor

In the window sorting criterion editor you can define a new criterion. From a selection of given criteria a new sorting formula is formed by weighting factors.

From the **Sorting criteria** window, click on **New** to open the **Sorting criteria editor** window.

Available criteria:

- X-Rite Optimum
- current dE
- dE [white/black]
- dE CIELab
- Metamerism M1
- Metamerism M2
- Number of components
- Ink film thickness
- Price
- Spectral deviation

Formula: factor x * criterion 1 + factor y * criterion 2 +… + factor n * criterion m

The weighting factor can be chosen within any number range. However, pay attention to the relation between different factors. The higher the factors are chosen the greater the total amount. The best value is the smallest one.

The following examples give you an understanding of the weighting factors:

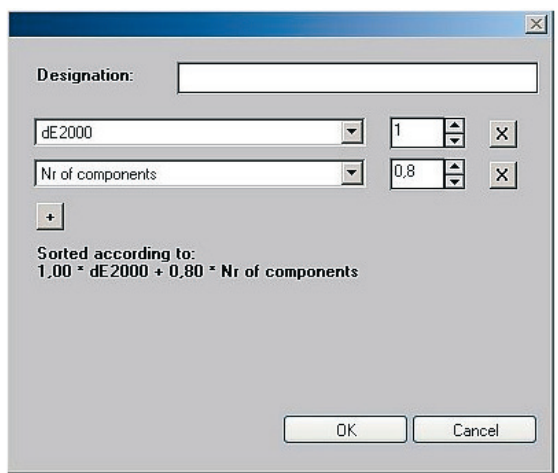
Example #1
If you set the factor of one criterion 1, this corresponds to the selected default criteria.
Set the factor of current dE 1.0 and finalize the **Sorting criterion editor** by clicking **OK**.
The new sorting formula: 1* current dE

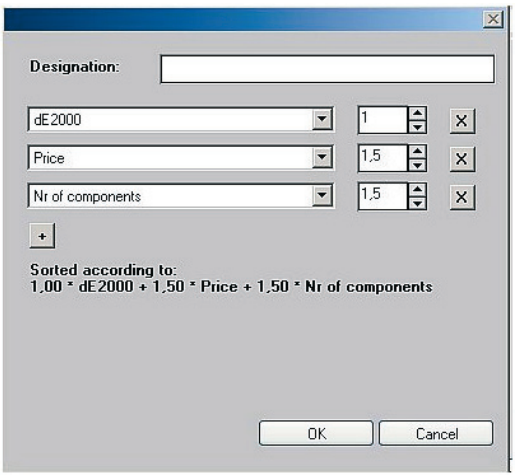
recipe	current dE	own sorting criterion
1	1.5	1.5

Example #2
You accept a higher current dE of 0.8 if you economize one ink component.
Set the following weighting factors (wf):
wf (current dE) = 1
wf (Nr of components) = 0.8
The new sorting formula: 1* current dE + 0.8* Nr of components

recipe	current dE	number of components	own sorting criterion
1	1.5	4	4.7
2	2.1	3	4.5
3	1.9	3	4.3

Recipe 1 has a minimal color distance, but 4 components are in use.
Recipe 2 has a higher current dE, but only with three components.
Recipe 3 is very good. The color distance is accepted and only three ink components are used.





Example #3

You accept a higher current dE of 1.5 if you economize one ink component and if you minimize the price.

Set the following weighting factors (wf):

wf (current dE) = 1

wf (price) = 1.5

wf (Nr of components = 1.5

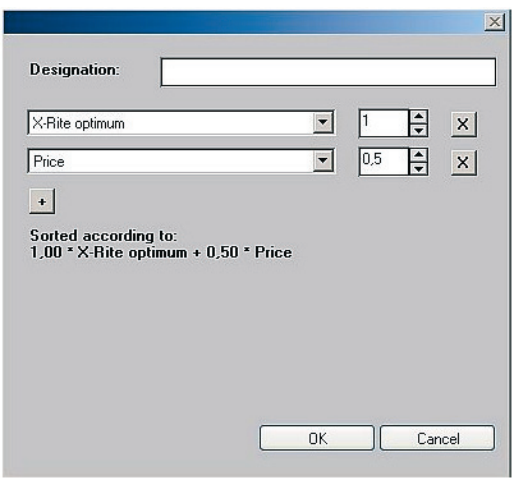
The new sorting formula: 1*current dE + 1.5*price + 1.5*Nr of components

recipe	current dE	price	number of components	own sorting criterion
1	3	1	5	9
2	2	2	4	11
3	1.5	1.50	5	11.25

Recipe 1 is a lower priced, but has a visible color distance

Recipe 2 is a higher price, but less components and an acceptable color distance

Recipe 3 has the best quality, but without economization



Example #4

You are satisfied with the X-Rite Optimum, but you would like to put more weight on the price.

Set the following weighting factors (wf):

wf (X-Rite Optimum) = 1

wf (price) = 0.5

The new sorting formula: 1*X-Rite Optimum + 0.5*price

Recipe	X-Rite Opt.	Price	own sorting criterion
1	1.8	2	2.8
2	2.5	2.50	3.75
3	2.2	1.80	3.1

Recipe 1: Value for X-Rite optimum is very good, but the recipe is expensive.

Recipe 2 is critical. The value for our sorting formula is the highest one because of the price and the optimum.

Recipe 3 is okay.

The user defined sorting criteria can be classified for basic and correction recipes. If the criterion is only available for one option, please deactivate the other one in the window: **sorting criterion editor**.

25.5 Thickness Calibration

25.5.1 How to calculate thickness for a reference assortment

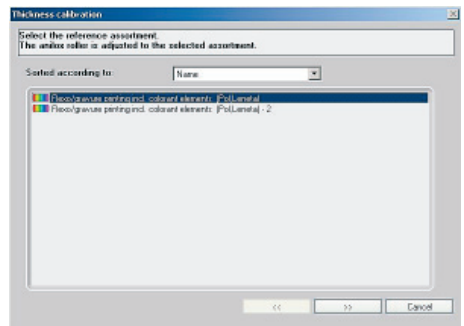
In order create film thickness parameters for a reference assortment, the user must define at least one recipe for each roller. There are two options available in the software to do this:

Option 1:
Select the automated calibration mode. For this calibration you will need to create recipes as required by InkFormulation.
Option 2:
Select the manual calibration mode. This mode is based on existing, measured recipes, which have been saved in InkFormulation for the selected assortment.

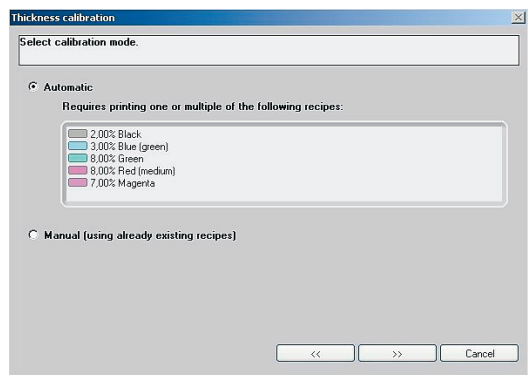
The following illustration shows that reference assortment A is created for roller R1. The ink film thickness is set at 100%.

Assortment	R1	R2	R3	R4
A	100%			
	→	75%		
	→		120%	
	→			240%

Read known recipes to calculate precise film thickness needed for other rollers. The known recipes contain the base colorant data of assortment A, and also the reference print conditions for the different rollers.
The thickness object is recalculated with those measurement values and returned to the user. The parameters of the thickness calibration data are stored in the system.



(reference assortment)

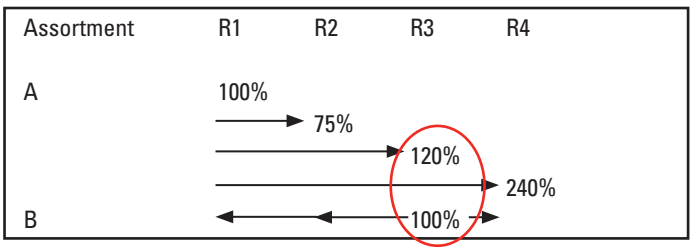


(two options)

25.5.2 Film thickness calibration in relation to other assortments

With known thickness

If an assortment is defined with known thickness calibration data, the same parameters can then be applied to a different assortment (see illustration). Assortment B is shown which was created with the roller R3. The system can then automatically determine the thickness needed for rollers R1, R2 and R4 because of the relation between the thickness objects.



With unknown thickness

If you create an assortment and the roller requirements are unknown, there is no relationship to the existing film thickness data sets. Only one recipe is required to establish the necessary relationship. The recipe used needs to be based on the new assortment and needs to be printed with the known roller. This would then allow the software to establish the relationship to all previous thickness data sets.

Assortment	R1	R2	R3	R4	R5
A	1.0	0.75	1.2	2.4	1.71
B	0.83	0.625	1.0	2.0	1.43
C	0.581	0.438	0.7	1.4	1.0

Assortment C is created with the film thickness R5. That thickness has no relation to other existing film thickness objects in the system. By printing ONE recipe within assortment C using roller R4, assortment C can be updated with correct thickness calibration data.

Using the Film Thickness Calibration module, the system can quickly and effectively determine film thickness data requirements and adjust them for other assortments. Your formulation process can be completed faster with fewer steps. You end up needing fewer assortments, as you no longer need to create data sets for each roller.

25.5.3 Film thickness calibration across substrates

The Film Thickness Calibration module calculates volume requirements across different substrates. The calibration set does not have to be remeasured for each substrate. However, we do not recommend creating recipes for various substrates based on data from just one.

If you are using different substrates for an assortment, we recommend creating categories; some examples follow:

- Coated
- Uncoated (newsprint)
- Uncoated (for different substrate textures)
- Color uncoated

You should create specific assortments for each general substrate application.

InkFormulation can automatically create recipes across different substrates, however, recipe quality can suffer if the substrate characteristics vary widely.

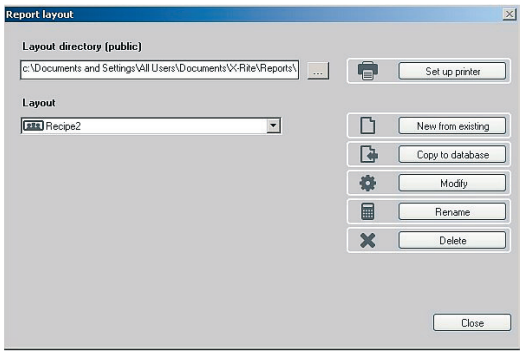
You have to make sure you are using the correct substrate when calibrating thicknesses. The system cannot calculate the accurate thickness characterization data with incorrect substrate data.

25.5.4 Exporting assortments and thickness characterization data

Assortments can be exported directly out of InkFormulation without losing the calibrated thickness data. The characterization data itself has to be transferred separately through the database.

25.6 Print layout editor

InkFormulation offers users the ability to customize individual print layouts using the new user-defined Print Layout Editor. This gives users the flexibility to customize their print layouts using logos, bar codes and labels, which can be inserted and printed to label ink cans and simplify inventory creation.



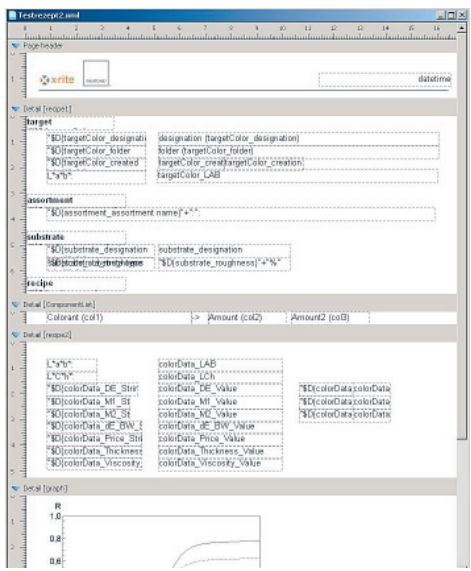
25.6.1 How to edit a Print Layout with NC Report Designer Software

NC Report Designer is an additional program that is included with InkFormulation. NCRD can be launched directly from within the InkFormulation program.

From the **Settings** menu, select **Setup Printer**. The Report layout window appears.
From here the user can adjust several settings:

- Set up printer
- Create a new layout from existing
- Copy a layout to the database
- Modify/ rename and delete existing layouts

To create a new print layout, please select an available layout and click on **New from existing**. After defining a designation, the NC Report Designer is opened and the selected layout is displayed.



As shown in the image, the layout is split into sections outlining different details:

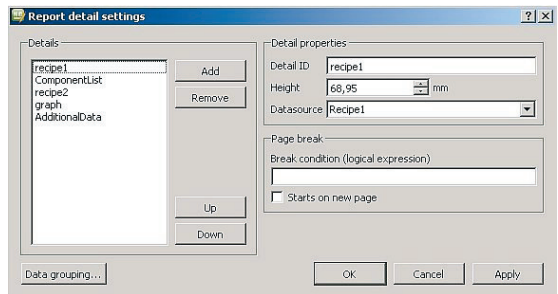
1) Page Header
2) Recipe 1
3) Component List
4) Recipe 2
5) Graph
6) Additional Data
7) Page Footer

All details can be modified. Data items can be moved via drag & drop as long as they stay in the same sections. You cannot move data across sections.

- Font, size and color can be modified
- Specific information can be deleted

Note: The borders as outlined (by InkFormulation) should NOT be altered.

In addition to the single lines and elements, the entire details can be edited at once. Choose **Report Detail Settings** from the **Report** menu. You'll then see the dialog box to the right. Here you can delete single details and rearrange the order the existing sections.



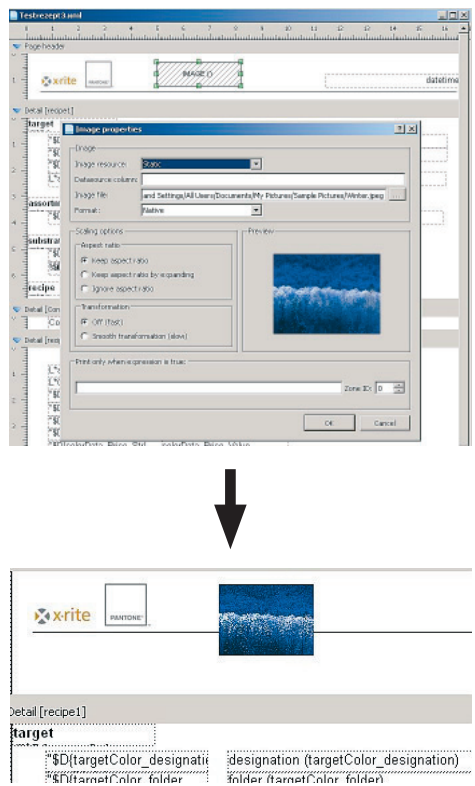
The sections "page header" and "page footer" can be deactivated in the menu "Report" -> "Report and Page settings" in the tab "Section Options".

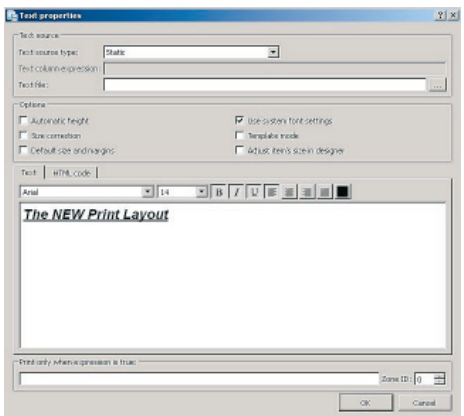
Logo insertion

In addition to the configuration of the print information, you can insert company logos or company specific data. You pick the desired item from the **Insert** menu.

After specifying the desired location on the page, and the image size within the document, the **Image Properties** dialog box will open. Here you can specify the file name of the image.

The image is immediately displayed in the dialog box. Choose **OK** to have it inserted into the layout.





Page sizing
In the menu you can change the orientation and size of your layout. You can pick one of the predefined formats or specify one of your own.

Text Insertion
Choose **Text** from the **Insert** menu. The Text properties dialog box appears where you can type in your desired text. You can also load a separate html file if you choose.

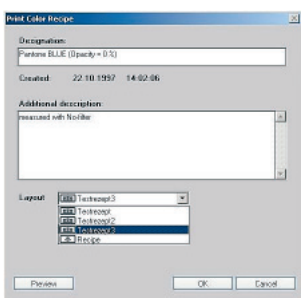
Click **OK** to accept the changes.

Modification of the decimal places in basic and correction recipes:
1. Please open a layout with NC Report Designer
2. Doubleclick in Detail “ComponentList” on “Amount” for basic or on “Amount2” for correction recipe.
3. A new window “Field properties” appears.
4. Select the option “Numeric”
5. On the right side you can define the decimal places.

When you have finished you can preview the draft by pressing **Ctrl-P**. Remember to save your changes (public or user-specific).

The new layout is then immediately available in InkFormulation.

Using Your Layouts
You can select only one layout from the **Print** menu at a time. You can verify the selection using the **Preview** feature.



26 Hotkeys

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26 Hotkeys

26.1 Overview

You can use hotkeys to execute various commands or to change windows quickly.

You can call up Help by pressing F1 in any situation. The other hotkeys are available from the main window.

Purpose	Press
Quit InkFormulation	Alt+F4
Copy recipe to clipboard	Ctrl+C
Send recipe to batching system	Ctrl+D
Define target color > Get	Ctrl+F
Measure current ink mixture	Ctrl+M
Creating a new recipe	Ctrl+N
Load recipe	Ctrl+O
Print recipe	Ctrl+P
Save recipe	Ctrl+S
Palette formulation	Shift+F4
Change to **Database: Basic materials** window	Shift+F5
Call up Help	F1
Calculate basic recipe	F2
Calculate correction recipe	F3
Recalculate recipe	F4
Change to **Database: Recipes** window	F5
Change to **Database: Assortments** window	F6
Change to **Database: Substrates** window	F7
Change to **Database: Substrate Sizes** window	F8
Change to **General Settings** window	F9
Change to **Formulation Settings** window	F10
Change to **SpectroServer Settings** window	F11
Change to **Batching Systems Settings** window	F12

27 Installing InkFormulation

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27 Installing InkFormulation

27.1 Hardware and software requirements

Minimum system requirements

- 800 MHz Pentium III PC or higher
- Windows XP SP2, Windows Vista, Windows 7
- 256 MB RAM
- 120 MB of available hard-disk space
- Screen resolution of 1024 x 768
- USB-Port for hardware key and additional USB- or Serial-Port for the measurement instrument
- Administrator rights for installation

Recommended system requirements

- Core 2 Duo, 2GHZ
- XP SP2, Windows Vista, Windows 7
- 2 GB RAM
- 100 GB of available hard-disk space
- Screen resolution of 1280 x 1024
- USB-Port for hardware key and additional USB- or Serial-Port for the measurement instrument
- Administrator rights for installation

Minimum system requirements for Online Version

- 3,2 GHz Pentium IV PC or higher
- For configurations up to 20 users: 4 GB RAM, Windows® Server 2003
- For configurations over 20 users: 200 MB RAM per user, Windows® Server 2003 R2 64bit Enterprise or DataCenter Edition
- Terminal Services and Application Server
- 100 GB of available hard-disk space
- Screen resolution of 1024 x 768
- USB-Port for hardware key
- Administrator rights for installation

27.2 Installation on a PC

27.2.1 Preparing for installation

If you already have an installed version of this software and are carrying out an update, you should make a complete backup copy of the program directory or a backup of the database (see Section 21.7 “Backing up the database”).

27.2.2 Installing on a personal computer

1. Start WINDOWS.
2. Insert the CD in the CD-ROM drive and wait till the **X-Rite Setup** window appears.
3. Click on the symbol for **InkFormulation**.

The Setup program now leads you step by step through the installation. Read all the displayed information carefully before proceeding with installation.

27.2.3 Connecting the PC to the measuring device

In order to be able to carry out measurements or read in data from the measuring device, it must be connected to any serial interface (COM1:, COM2:, ..., COMn:) or to a USB port using a USB serial converter. While you are working with InkFormulation you can also disconnect the measuring device at any time for offline measurements and then reconnect it to the computer. InkFormulation is able to recognize the selected interface itself.

27.2.4 Installing the harware key

Connect the hardware key to a USB port of your personal computer.

28 User administration

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28 User administration

28.1 General

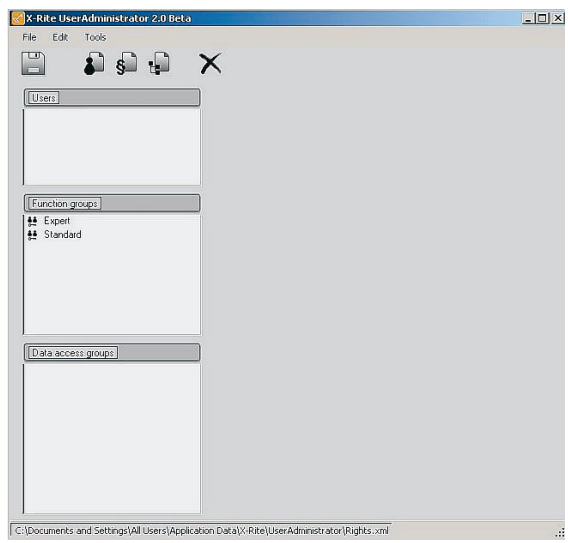
User administration is an additional program enabling you to define the access rights of the individual users to the functions of the various X-Rite programs.

The User administration program displays all functions of the different X-Rite programs. However, only those functions can be switched on and off which are authorized by the hardware key.

User administration also allows users to be assigned to particular data access groups. This means that application data can be easily used jointly and protected from unauthorized access.

28.2 Screen structure

28.2.1 Main window



Rights group

Rights groups define access rights to specific functions of various programs for the groups in question.

New groups can be added and existing ones deleted.

User

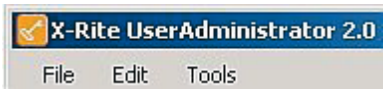
Each user can be assigned to one or more rights groups. A user who belongs to several rights groups has all the access rights granted to those rights groups.

New users can be added and existing ones deleted.

Data access groups

Data access groups define the structure for access rights to data. Any user can be a member of a data access group. A higher ranking group has read and edit rights to all the data in a lower ranking group. A lower-ranking group has read-only rights to all the data in the group. No group can read or edit the data of an adjacent group.

Data access groups can be added or deleted.



28.2.2 Menu list

The following functions can be carried out on the various menus:

- File - Backup and restore user data
  - Close the program
- Edit - Undo
- Tools - Settings

28.2.3 Symbols list

Save user data

New user

New right group

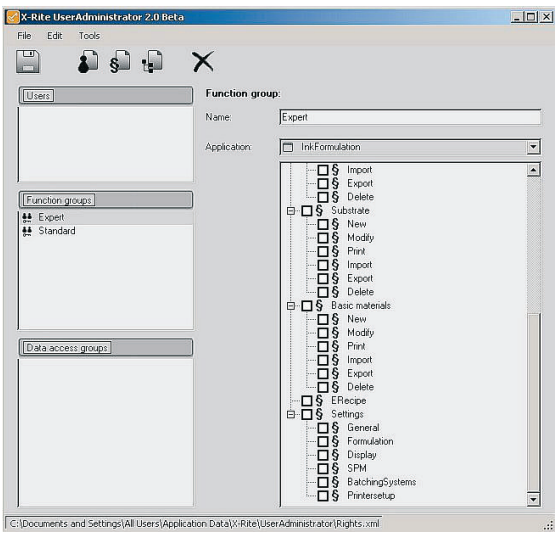
New data access group

Delete

28.3 Use

28.3.1 Processing authorization groups

Entering new authorization groups



1. Click on the **Rights** symbol.
2. Make the following entries:
   - Right name.
   - Select the Application the **Right Group** will have access.

   If you activate the check box for the main directory for a program, all subordinate functions will also be activated. Open the sub-directories to activate/deactivate the individual functions. Functions which are not authorized by the harware key cannot be activated.
3. Click on **OK**, to return to the main window. Then you can enter or process other users or groups.
4. Click in the main window on the **Save** symbol to activate the entries you have made.

You can save current user data in any directory and load it when required.

Processing authorization groups

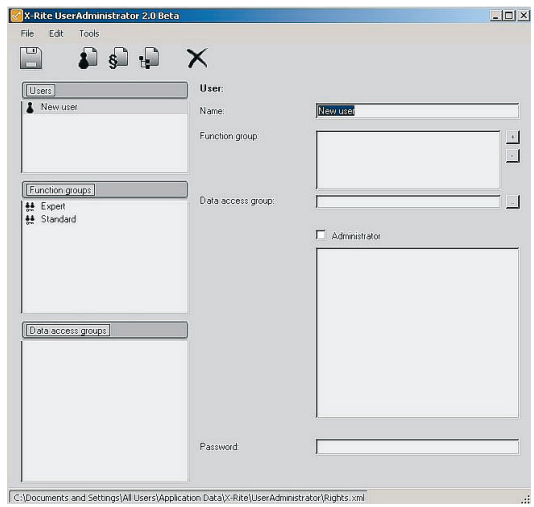
The access rights for a group can also be changed later in the directory tree of the main window.

1. In the directory tree open the relevant authorization group and activate the check box for the required programs/functions.
2. Click on the **Save** symbol to activate the entries you have made.

28.3.2 Processing user data

Enter a new user

1. Click on the **New user** symbol.
2. Enter one user name.
3. Make the remaining entries:
   - Activate the check boxes for the rights group to which the new users are to be assigned.
   - A user can be assigned to more than one rights group.
- Assigning to a data access group (optional).
- Password (optional).
4. Click on **OK** to return to the main window. You can then enter or edit other users or groups.
5. Click on the **Save** symbol in the main window to activate the entries you have made.



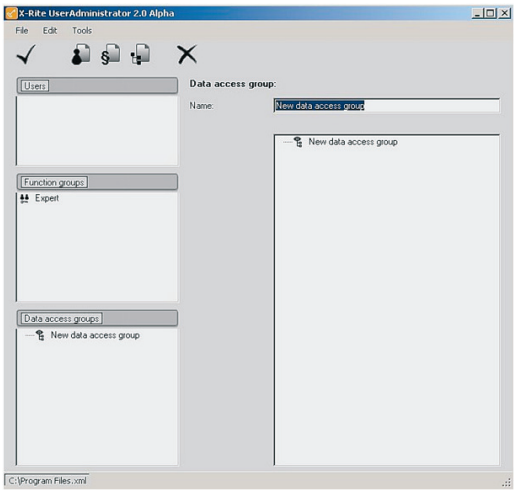
Note: Under Windows NT, 2000 or XP the program (InkFormulation, ColorQuality) checks the user name. If the active user name is found in the user administration, it is automatically selected and the password dialog box is omitted.

Current user data can be backed up in another folder and reloaded if necessary.

Processing user rights

The access rights for a user can also be changed later in the directory tree of the main window.

1. Open the relevant user directory and activate the check box for the required authorization groups.
2. Click on the **Save** symbol to activate the entries you have made.



28.3.3 Defining a new data access group

1. Highlight the data access group which should be directly above the new group .
2. Click on new data access group symbol.
3. Enter the name.
4. Click on the Save symbol in the main window to activate the entries you have made.

28.3.4 Backing up and restoring user data

By clicking on the **Backup** or **Restore** symbol or via the menu **File** > **User data** > **Backup** or **Restore,** an Explorer window is opened. Here you can backup the data into a file or restore it.

28.4 Installing User administration

When you install **X-Rite InkFormulation™** you will be asked whether you want to install **User administration**. Follow the instructions on the screen.

29. Glossary

29 Glossary

Absorption Light passing through an ink film is weakened to a greater or lesser degree, depending on the thickness of the film and the wavelength of the light. In combination with the scattering capacity, this produces the optical effect of the ink.

Additional ink quantity Quantities of inks which have to be added to an ink mixture to bring it closer to the target color.

Assortment An assortment is a selection of colorants used for a recipe calculation. Each assortment includes one or more transparent white and one substrate.

Clipboard A WINDOWS program which serves to exchange data between different programs.

Color distance dE The geometric distance between the color recipe and the target color in the Lab color system. The sensitivity of the eye to color distance is roughly proportional to the dE value (dE = 1 is just visible). The color distance is optimized to the illuminant and observer settings of the program.

Color values Every color can be represented by three values. If two different colors match in terms of these values, this means that they will appear the same under a particular form of lighting (e.g. electric bulb light, daylight). InkFormulation works with the so-called CIE-Lab-System. The CIE-Lab-System is a color system adapted to the human eye. In other words, the geometric distance in the color system (dE) closely represents the visual distance between two colors. For a more detailed explanation, it will be necessary to refer to the literature on colorimetry. Here, we note simply the following:

L-coordinate: Measurement for brightness (range from 0 to 100)
a-coordinate: Value of red-green axis (+ a = red / - a = green)
b-coordinate: Value of blue-yellow axis (+ b = yellow / - b = blue)
C-coordinate: Measurement for saturation
h-coordinate: Measurement for hue (range from 0 to 360)

Colorant calibration A colorant calibration consists of a certain number of proportionately different mixtures of an ink with transparent white on white and black substrate. The absorption capacity of the ink can be determined from the different concentration grades on white substrate and the scattering capacity from the different concentration grades on black substrate.

Colorant calibration series	A colorant calibration series consists of a selection of calibrations of various colorants using the same substrate, the same transparent white and the same production process. As a rule, one colorant calibration series is allocated to one assortment.
dE X-Rite	dE X-Rite is a quality criterion for using ink leftovers. Among other things, it takes into account the fact that it is very difficult to achieve a pure ink with a dirty ink leftover.
X-Rite-Optimum	Sorting criterion for recipe quality. The sort value is a compromise (weighted summation) of color distance, metamerism, and further criteria (e.g. number of colorant components). In the case of a recipe correction, the additional ink quantity is taken into consideration too.
Ink film thickness	Every assortment is assigned an average ink film thickness. The film thicknesses (weight per area) of the recipes calculated are related to the average weight per area (=100%) of the current assortment.
Ink leftover	Ink of known or unknown composition left over from previous jobs and used for the production of a current target color.
Ink mixture	Ink mixed in accordance with a recipe in order to produce a pattern.
Metamerism	Measurement of the difference of the remission curves of two colors which look the same under a given form of lighting (e.g. electric bulb light, daylight). Only colors which display the same remission curves (M=0) will be perceived as the same under various light sources.
Remission	Ratio of the light reflected from a color to the light reflected from ideal or paper white, depending on wavelength. The range extends from 0 to 1. The value 1 means that the color reflects as much light as ideal or paper white.
Scattering	When light passes through an ink film, it is scattered to a greater or lesser degree by pigment particles, depending on the thickness of the film and the wavelength of the light. Absorption and scattering together produce the optical effect of a color.
Surface coverage	Area of the substrate covered by ink.
Weight per area	Every assortment is assigned an average weight per area. The film thicknesses (weight per area) of the recipes calculated are related to the average weight per area (=100%) of the current assortment.

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